



Focus on Energy Calendar Year 2021 Evaluation Report

VOLUME III APPENDICES

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Appendix A. Key Achievements and Figures for State of Wisconsin and Focus on Energy

Offering Participants

- CY 2021 Residential: 168,474
Upstream Lighting and Income Qualified Participation: 944,226
- CY 2021 Nonresidential: 4,283
- CY 2021 Midstream: 1,555
- CY 2021 Total Participants: 174,312

Total Electric and Natural Gas Energy Usage

- CY 2020 Electric Sales to Wisconsin Retail Customers megawatt hours (MWh): 67,448,361¹
- CY 2020 Wisconsin Aggregated Electric Utilities Noncoincident Peak Demand megawatts (MW): 16,544²
- CY 2021 Natural Gas Consumption (MThms): 3,919,062³

Total Verified Gross Annual Savings

- CY 2021 Energy Savings (MWh): 700,606
- CY 2021 Demand Reduction (MW): 92
- CY 2021 Natural Gas Savings (therms): 20,391,808

Total Verified Net Annual Savings

- CY 2021 Energy Savings (MWh): 450,998
- CY 2021 Demand Reduction (MW): 58
- CY 2021 Natural Gas Savings (therms): 15,365,657

¹ U.S. Energy Information Administration. Independent Statistics and Analysis. "Wisconsin Electricity Profile 2020." <https://www.eia.gov/electricity/state/Wisconsin/>

² Ibid.

³ U.S. Energy Information Administration. Independent Statistics and Analysis. "Natural Gas Consumption by End Use." https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SWI_a.htm

Total Verified Gross Lifecycle Savings

- CY 2021 Energy Savings (MWh): 9,354,785
- CY 2021 Demand Reduction (MW): 92
- CY 2021 Natural Gas Savings (therms): 344,702,531

Total Verified Net Lifecycle Savings

- CY 2021 Energy Savings (MWh): 6,377,760
- CY 2021 Demand Reduction (MW): 58
- CY 2021 Natural Gas Savings (therms): 255,173,062

Population Numbers (CY 2020)

- Statewide Census Population: 5,895,908⁴
- Wisconsin Residential Electric Accounts: 2,742,424⁵
- Wisconsin Nonresidential Electric Accounts: 360,316⁶
- Wisconsin Residential Gas Accounts: 1,811,337⁷
- Wisconsin Nonresidential Gas Accounts: 173,426⁸

⁴ U.S. Census Bureau. “Annual Population Estimates, Estimated Components of Resident Population Change, and Rates of the Components of Resident Population Change for the United States ” <https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-total.html>

⁵ U.S. Energy Information Administration. “Annual electric power industry Report, Form EIA-861 detailed data files.” Sales, revenue, and energy efficiency. <https://www.eia.gov/electricity/data/eia861/>

⁶ Ibid.

⁷ U.S. Energy Information Administration. “Number of Natural Gas Consumers.” https://www.eia.gov/dnav/ng/ng_cons_num_dc_u_SWI_a.htm

⁸ Ibid.

Table A-1. CY 2021 Costs, Benefits, and Modified TRC Test Results by Sector Combined

	Residential	Nonresidential	Midstream	Renewables	Total
Incentive Costs ^a	\$19,043,336	\$27,749,393	\$718,575	\$3,542,820	\$51,054,123
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,670,313
Incremental Measure Costs	\$55,007,131	\$156,359,330	\$3,828,757	\$36,649,776	\$251,844,994
Total Non-Incentive Costs	\$66,034,146	\$175,445,299	\$4,460,517	\$37,279,853	\$283,219,815
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,897	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$-	\$133,749,777
Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997
T&D Benefits	\$7,273,085	\$40,592,169	\$234,106	\$8,904,919	\$57,004,279
Total TRC Benefits	\$108,758,449	\$494,531,361	\$6,762,750	\$55,191,349	\$665,243,908
TRC Benefits Minus Costs	\$42,724,303	\$319,086,061	\$2,302,232	\$17,911,496	\$382,024,093
TRC Ratio	1.65	2.82	1.52	1.48	2.35
TRC Ratio without T&D Benefits	1.54	2.59	1.46	1.24	2.15

^a Incentive costs are shown for clarity, but are not included as part of Modified Total Resource Cost (TRC) costs for testing

Appendix B. Glossary of Terms

Term	Definition
Attribution	The establishment of a causal relationship between action(s) taken by a group or program and an outcome. Being attributable to a program means that energy savings and demand reduction can be viewed as a result of the program influence, and the savings would not have been achieved in the program’s absence.
Avoided Costs	Costs to the utility avoided by implementing an energy efficiency measure, program, or practice.
Administrative Costs	Costs not directly associated with a specific program activity but necessary to the development and administration of programs, including record keeping, payroll, accounting, auditing, billing, business management, budgeting and related activities, overhead allocation, and other costs necessary to direct the organization of the program.
Baseline	Conditions (including energy consumption) that would have occurred without implementing the measure or project. These conditions can be either as-found (prior to the energy efficiency retrofit or to conditions that meet the state or federal efficiency codes) or a combination of efficient and nonefficient conditions derived from data.
Benefit/Cost Ratio	Mathematical relationship between the benefits and costs associated with implementing energy efficiency measures, programs, or practices or including emission reduction benefits resulting from such implementation.
Claimed Savings	Energy savings the offering administrator or offering implementer reports before verification by the Evaluation Team (also called <i>ex ante</i> savings, reported savings, or tracked savings).
Cost-Effectiveness	Comparison of the benefits and costs associated with implementing energy efficiency measures and programs. The actual benefits and costs included can vary based on the design and intent of different cost-effectiveness tests.
Custom Savings	Savings for nonprescriptive measures that do not meet the criteria for deemed savings as calculated by the offering administrator or offering implementer at the time of project completion. The result reflects savings for the specific project based on pre- and post-installation energy use.
Deemed Savings	An estimate of energy, demand, or natural gas savings for a single unit of an installed energy efficiency measure. Deemed savings are typically developed from data sources and analytical methods that are widely considered acceptable for the measure and are applicable to the situation.
Downstream Offering	An efficiency program that provides incentives to the end user by directly offsetting the first cost of the equipment and reducing the payback period.
Ex Ante Savings	Energy savings the Offering Administrator or Offering Implementer reports before verification by the Evaluation Team (also called claimed savings, reported savings, or tracked savings).
Ex Post Evaluation	An assessment of an activity’s impact(s) after completion.
Estimated Savings	Savings estimated by an evaluator after conducting an energy impact evaluation.
Freeriders	Participants who took part in an efficiency program but would have adopted the energy-efficient measure in the program’s absence. Freeriders can be total, partial, or deferred.
Gross Savings	The unadjusted program-reported change in energy consumption or demand resulting from efficiency program–related actions taken by participants.
Interactive Effects	The influence of one technology application on the energy required to operate another application.
Locational Marginal Price	The marginal cost to serve a unit of energy at a specific location at the time of delivery.
Lifecycle Savings	Energy savings—expressed as verified gross or verified net—generated from measures installed in the current program cycle over each measure’s effective useful life.

Term	Definition
Lifetime Savings	Energy savings—expressed as verified gross or verified net—produced as a result of measures installed in the current and previous program cycles, provided that the reporting period falls within each measure’s useful life. This incorporates annual savings and each measure’s effective useful life.
Market Effects	Changes in marketplace practices, services, and promotional efforts that induce businesses and consumers to buy energy-saving products and services without direct offering assistance. Evaluators generally consider these effects as resulting from offering impacts on the market.
Market Lift	An increase in efficient product sales above a pre-established baseline in response to program incentives, promotion, or advertising.
Measure Life	The life of an energy consuming measure, including its equipment life and savings persistence.
Midstream Offering	An efficiency program that targets retailers, distributors, or both. Midstream programs are designed to encourage the targeted audience to stock, promote, and sell more energy-efficient products. Incentives are paid directly to the retailer or distributor.
Net Savings	Savings net of what would have occurred in the program’s absence (observed impacts attributable to the program). Net savings are typically calculated by applying the net-to-gross ratio to the verified gross savings.
Net-to-Gross Ratio	The ratio of verified net savings (attributed to the program after evaluation) to the verified gross savings.
Non-Energy Benefits	An array of valued attributes, such as increased property values or reduced water usage, that were derived from energy-efficient measures in addition to energy savings.
Nonparticipant Spillover	The effect on eligible general consumers who did not participate in an efficiency program yet adopted energy saving products or practices because of program influence.
Participant Spillover	The effect of participants who, after an initial program experience, adopt more energy saving products or practices without program assistance.
Precision	The degree to which repeated measurements under unchanged conditions produce the same results.
Realization Rate	The ratio of gross savings to verified gross savings.
Reported Savings	Energy savings the offering administrator or offering implementer reports before verification by the evaluation team (also called tracked savings, <i>ex ante</i> savings, or claimed savings).
Resource Acquisition Offering	An efficiency program designed to directly achieve energy savings and/or demand reduction, as well as avoided emissions.
Standard Error	The measure of a data sample’s variability (that is, the distance of a typical data point from the sample mean).
Tracked Savings	Energy savings the offering administrator or offering implementer reports before verification by the Evaluation Team (also called reported savings, <i>ex ante</i> savings, or claimed savings).
Unclaimed Rewards	Incentives set aside for customers who fail to submit paperwork to claim program incentives.
Upstream Offering	An efficiency program designed to encourage retailers and manufacturers to promote and sell more energy-efficient products. These programs provide incentives to retailers or manufacturers, which are passed through to customers.
Verified Gross Savings	Energy savings that are verified by an independent evaluation team and are based on inspections and reviews of the number and types of implemented energy efficiency measures and the engineering calculations used to estimate the energy saved. Verified gross savings reflect total calculated savings based on changes in energy consumption or demand resulting from program-related actions taken by participants in an efficiency program without considering the influence of freeridership or spillover.
Verified Net Savings	Energy savings that evaluators can confidently attribute to program efforts. To calculate verified net savings, evaluation team makes adjustments for outside influences, such as freeridership and spillover.

Appendix C. Acronyms and Abbreviations

Acronym	Term	Acronym	Term
ACS	American Community Survey	MWh	Megawatts per hour
AVERT	AVoided Emissions and geneRation Tool	NCP	National Consumer Panel
BPK	Benefits per kilowatt-hour	NPSO	Nonparticipant Spillover
Btu	British thermal unit	NTG	Net-to-gross
Btu/h	British thermal unit per hour	OLS	Ordinary least squares
C&I	Commercial and Industrial	POS	Point-of-sale
COBRA	Co-Benefits Risk Assessment	PRISM	PRInceton Scorekeeping Method
CREED	Consortium for Retail Energy Efficiency Data	PSC	Public Service Commission of Wisconsin
CY	Calendar year	PTAC	Packaged terminal air conditioner
DSM	Demand-side management	PTHP	Packaged terminal heat pump
EISA	Energy Independence and Security Act	PV	Photovoltaic
EPA	U.S. Environmental Protection Agency	RECIP	Renewable Energy Competitive Incentive Program
EUL	Expected useful life	RIM	Ratepayer impact measure test
HOU	Hours of use	SEER	Seasonal energy efficiency rating
ISR	In-service rate		Statewide Program for Energy Customer
kW	Kilowatt	SPECTRUM	Tracking, Resource Utilization, and Data Management
kWh	Kilowatt hour	T&D	Transmission and distribution
LED	Light-emitting diode	TRC	Total resource cost test
LPD	Lighting Power Density	TRM	Technical reference manual
MBtu	Thousand British thermal units	UAT	Utility administrator cost test
MBtu/h	Thousand British thermal units per hour	UEC	Unit energy consumption
MISO	Midcontinent Independent Transmission System Operator	UMP	Uniform Methods Project
MMBtu	Million British thermal units	UPC	Universal product code
MMBtu/h	Million British thermal units per hour	VFD	Variable frequency drive
MMID	Master measure identification		
MThms	Thousand therms		
MW	Megawatt		

Appendix D. CY 2021 Voluntary Program Efficiency Savings and Participation

In CY 2021, the Public Service Commission of Wisconsin (PSC) authorized Northern States Power (Xcel Energy), We Energies, Wisconsin Power and Light, and Wisconsin Public Service to run and fund voluntary programs in addition to the funding they contribute to Focus on Energy.

In general, these voluntary programs are designed to complement Focus on Energy offerings by providing bonus incentives on top of the existing Focus on Energy incentives or offering additional energy efficiency savings opportunities for customers in the respective utility territories. For a number of these voluntary programs that build on existing offerings, their kilowatt, kilowatt-hour, and therms savings are not considered additive savings but are instead Focus on Energy portfolio savings achieved by the projects. Savings for We Energies’ Voluntary Design Assistance Program are not currently claimed by Focus on Energy.

Table D-1 presents the CY 2021 program savings and participation for Northern States Power, We Energies, and Wisconsin Public Service.

Table D-1. CY 2021 Utility Voluntary Energy Efficiency Program Gross Annual Savings and Participation

Program ^a	Participation	kW (Ex Ante)	kWh (Ex Ante)	therms (Ex Ante)	kW (Verified)	kWh (Verified)	therms (Verified)
Northern States Power Wisconsin Community Conservation Program ^b	3,875	N/A	N/A	N/A	5,194	43,544,961	1,870,477
We Energies Voluntary Design Assistance Program	5	142	1,150,604	43,075	N/A	N/A	N/A
We Energies Residential Natural Gas Assistance Program ^c	145	N/A	N/A	N/A	N/A	N/A	33,030
Wisconsin Public Service Residential Assistance Program ^d	10	N/A	N/A	N/A	N/A	N/A	1,833

^a CY 2021 participation and savings data for Wisconsin Power and Light’s voluntary energy efficiency programs were not available at the time of this report. See Wisconsin PSC Docket 6680-EE-2021 for additional details.

^b Northern States Power Wisconsin (operating company for Xcel Energy) offers the Community Conservation Program, which is designed to complement Focus on Energy offerings by adding bonus incentives for both residential and business customers throughout the service territory. See Wisconsin PSC Docket 4220-EE-2021 for additional details. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=431676>

^c We Energies Residential Natural Gas Assistance Program. See Wisconsin PSC Docket 5-EE-2021 for additional details. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=434013>

^d Wisconsin Public Service Residential Assistance Program. See Wisconsin PSC Docket 6690-EE-2021 for additional details. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=434012>

Appendix E. Detailed Findings

This section contains detailed first-year annual gross savings and lifecycle savings for the residential, nonresidential, and midstream channels as well as savings organized by offering and measure category.

Overview of Savings

Table E-1 lists the CY 2021 gross, verified gross, and verified net savings claimed basis prior to verification.

Table E-1. CY 2021 First-Year Annual Savings Split between Residential, Nonresidential, and Midstream

Savings Type	Unit	Residential	Nonresidential	Midstream	Total
Gross	MMBtu	1,323,524	3,111,472	47,679	4,482,675
	kWh	273,473,362	428,231,671	2,774,811	704,479,844
	kW	33,440	59,350	244	93,034
	therms	3,904,324	16,503,459	382,113	20,789,896
Verified Gross	MMBtu	1,299,932	3,081,470	48,245	4,429,647
	kWh	270,619,915	427,125,742	2,859,897	700,605,554
	kW	32,514	59,379	263	92,157
	therms	3,765,770	16,241,170	384,868	20,391,808
Verified Net	MMBtu	695,690	2,331,434	48,245	3,075,370
	kWh	123,385,300	324,752,442	2,859,897	450,997,640
	kW	13,053	44,912	263	58,229
	therms	2,746,998	12,233,791	384,868	15,365,657

Table E-2 lists the lifecycle savings achieved by Focus on Energy in CY 2021. Lifecycle savings represent the savings an offering can realize through measures over these measures' effective useful life.

Table E-2. CY 2021 Lifecycle Savings Split between Residential, Nonresidential, and Midstream

Savings Type	Unit	Residential	Nonresidential	Midstream	Total
Gross	MMBtu	16,335,281	49,591,512	743,049	66,669,842
	kWh	2,828,780,238	6,505,540,319	41,900,189	9,376,220,746
	kW	33,440	59,350	244	93,034
	therms	66,834,830	273,946,084	6,000,853	346,781,767
Verified Gross	MMBtu	16,119,330	49,516,438	753,010	66,388,778
	kWh	2,817,322,462	6,494,125,244	43,336,920	9,354,784,626
	kW	32,514	59,379	263	92,157
	therms	65,066,257	273,584,829	6,051,445	344,702,531
Verified Net	MMBtu	9,049,450	37,475,765	753,010	47,278,224
	kWh	1,403,092,847	4,931,330,466	43,336,920	6,377,760,233
	kW	13,053	44,912	263	58,229
	therms	42,620,968	206,500,650	6,051,445	255,173,062

Summary of Savings by Offering

Table E-3 summarizes the first-year annual savings by offering.

Table E-3. Summary of First-Year Annual Savings by Offering, CY 2021

Solution Name	Offering Name	Gross			Verified Gross			Verified Net		
		kWh	kW	therms	kWh	kW	therms	kWh	kW	therms
Residential Offerings										
Direct to Customer	Farmhouse Kits	79,964	7	3,826	81,668	7	3,972	66,713	6	3,844
	Online Marketplace	13,668,679	688	768,706	12,877,678	601	653,200	10,792,210	493	554,748
	Packs	18,249,925	1,709	577,082	18,344,096	1,705	589,671	15,600,662	1,457	564,233
	Retail	208,051,209	22,043	137,277	205,351,601	21,356	133,830	79,591,032	7,030	84,922
	Rural Retail Events	1,919,088	213	18,423	1,615,289	140	11,273	1,344,022	116	10,845
Trade Ally	Heating and Cooling	4,963,353	266	1,516,665	6,054,068	315	1,490,203	5,252,667	227	1,145,569
	Insulation and Air Sealing	1,864,214	686	396,017	1,883,475	691	397,296	2,291,256	891	358,521
	Renewable Energy, Residential	20,376,171	6,875	-	20,111,281	6,744	-	8,446,738	2,833	-
New Construction	Residential New Construction	4,300,760	955	486,326	4,300,760	955	486,326	-	-	24,316
Residential Total		273,473,362	33,440	3,904,324	270,619,915	32,514	3,765,770	123,385,300	13,053	2,746,998
Midstream Offerings										
Midstream	Midstream	2,774,811	244	382,113	2,859,897	263	384,868	2,859,897	263	384,868
Midstream Total		2,774,811	244	382,113	2,859,897	263	384,868	2,859,897	263	384,868
Nonresidential Offerings										
Business and Industry	Agribusiness	32,683,280	4,238	240,760	32,356,447	4,195	240,760	27,826,545	3,608	207,053
	Commercial and Industrial	122,630,766	17,449	1,979,485	122,630,766	17,449	1,979,485	94,425,690	13,436	1,524,204
	Large Industrial	152,336,683	16,511	8,140,893	152,336,683	16,511	7,896,666	112,729,145	12,218	5,843,533
Schools and Government	Government	25,117,214	2,530	1,593,990	25,117,214	2,530	1,593,990	18,335,566	1,847	1,163,613
	Schools	32,099,882	5,387	2,176,609	32,099,882	5,387	2,176,609	23,432,914	3,932	1,588,925
New Construction	Prescriptive	19,477,412	2,973	565,446	18,698,315	2,943	565,446	15,145,635	2,384	458,011
	Energy Design Review	27,583,637	5,052	1,806,276	27,583,637	5,153	1,788,213	22,342,746	4,174	1,448,453
Trade Ally	Renewable Energy, Nonresidential	15,073,048	4,972	0	15,073,048	4,972	0	9,370,534	3,091	0
RECIP	RECIP	1,229,749	238	0	1,229,749	238	0	1,143,667	222	0
Nonresidential Total		428,231,671	59,350	16,503,459	427,125,742	59,379	16,241,170	324,752,442	44,912	12,233,791
Total All Offerings		704,479,844	93,034	20,789,896	700,605,554	92,157	20,391,808	450,997,640	58,229	15,365,657

Table E-4 summarizes the lifecycle savings by offering.

Table E-4. Summary of Lifecycle Savings by Offering, CY 2021

Solution Name	Offering Name	Gross		Verified Gross		Verified Net	
		kWh	therms	kWh	therms	kWh	therms
Residential Offerings							
Direct to Customer	Farmhouse Kits	671,293	42,895	679,081	43,804	569,849	42,295
	Online Marketplace	125,184,755	7,863,442	116,995,975	6,616,018	98,417,895	5,623,120
	Packs	162,669,989	7,146,717	159,408,187	7,220,542	138,474,095	6,899,768
	Retail	1,785,082,503	1,377,754	1,771,604,097	1,343,454	816,573,335	853,739
	Rural Retail Events	15,275,082	194,490	12,773,331	123,270	10,758,809	117,669
Trade Ally	Heating and Cooling	63,216,374	27,550,886	85,261,520	27,021,531	80,096,869	21,025,645
	Insulation and Air Sealing	38,279,265	8,068,858	38,822,548	8,107,849	47,033,547	7,329,244
	Renewable Energy, Residential	509,405,279	0	502,782,023	0	211,168,450	0
New Construction	Residential New Construction	128,995,699	14,589,788	128,995,699	14,589,788	0	729,489
Residential Total		2,828,780,238	66,834,830	2,817,322,462	65,066,257	1,403,092,847	42,620,968
Midstream Offerings							
Midstream	Midstream	41,900,189	6,000,853	43,336,920	6,051,445	43,336,920	6,051,445
Midstream Total		41,900,189	6,000,853	43,336,920	6,051,445	43,336,920	6,051,445
Nonresidential Offerings							
Business and Industry	Agribusiness	539,581,754	4,615,158	539,581,754	4,615,158	464,040,309	3,969,036
	Commercial and Industrial	1,684,606,216	28,039,465	1,684,606,216	28,039,465	1,297,146,786	21,590,388
	Large Industrial	2,240,414,803	136,976,966	2,240,414,803	136,976,966	1,657,906,954	101,362,955
Schools and Government	Government	359,571,707	28,144,523	359,571,707	28,144,523	262,487,346	20,545,502
	Schools	440,217,325	29,653,643	440,217,325	29,653,643	321,358,648	21,647,159
New Construction	Prescriptive	285,381,367	10,390,809	273,966,112	10,390,809	221,912,551	8,416,555
	Energy Design Review	551,672,740	36,125,520	551,672,740	35,764,265	446,854,919	28,969,054
Trade Ally	Renewable Energy, Nonresidential	376,826,027	0	376,826,207	0	234,263,360	0
RECIP	RECIP	27,268,380	0	27,268,380	0	25,359,593	0
Nonresidential Total		6,505,540,319	273,946,084	6,494,125,244	273,584,829	4,931,330,466	206,500,650
Total All Offerings		9,376,220,746	346,781,767	9,354,784,626	344,702,531	6,377,760,233	255,173,062

Summary of Savings by Measure

Table E-5 summarizes CY 2021 residential savings by measure category.

Table E-5. Summary of First-Year Annual Savings by Measure Category, Residential Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Boilers & Burners-Boiler	0	0.00%	0	0.00%	157,671	4.19%	\$304,425	1.49%
Boilers & Burners-Controls	11,375	0.00%	0	0.00%	1,540	0.04%	\$1,750	0.01%
Boilers & Burners Tune-up/Repair/CX	0	0.00%	0	0.00%	370	0.01%	\$1,160	0.01%
Building Shell-Air Sealing	146,608	0.05%	11	0.04%	27,741	0.74%	\$985,957	4.82%
Building Shell-Bonus	0	0.00%	0	0.00%	0	0.00%	\$106,800	0.52%
Building Shell-Insulation	1,736,868	0.64%	679	2.09%	369,554	9.81%	\$1,093,961	5.34%
Domestic Hot Water-Aeration	1,081,222	0.40%	77	0.24%	213,021	5.66%	\$145,092	0.71%
Domestic Hot Water-Bonus	0	0.00%	0	0.00%	0	0.00%	\$66,000	0.32%
Domestic Hot Water-Insulation	1,998,250	0.74%	289	0.89%	238,547	6.33%	\$232,074	1.13%
Domestic Hot Water-Other	114,082	0.04%	15	0.05%	46,980	1.25%	\$82,501	0.40%
Domestic Hot Water-Showerhead	1,807,707	0.67%	88	0.27%	357,592	9.50%	\$336,701	1.64%
Domestic Hot Water-Water Heater	0	0.00%	0	0.00%	19,904	0.53%	\$23,500	0.11%
HVAC-Air Conditioner - Residential	2,206	0.00%	4	0.01%	0	0.00%	\$3,411	0.02%
HVAC-Bonus	0	0.00%	0	0.00%	0	0.00%	\$900	0.00%
HVAC-Controls	11,187,170	4.13%	0	0.00%	773,339	20.54%	\$1,314,473	6.42%
HVAC-Furnace	2,949,818	1.09%	0	0.00%	951,347	25.26%	\$3,072,075	15.01%
HVAC-Other	-1,089,999	-0.40%	14	0.04%	119,196	3.17%	\$187,300	0.91%
HVAC-Packaged Terminal Unit (PTAC, PTHP)	67,735	0.03%	8	0.03%	0	0.00%	\$3,100	0.02%
HVAC-Rooftop Unit/Split System AC	127,072	0.05%	211	0.65%	0	0.00%	\$29,250	0.14%
HVAC-Tune-up/Repair/Commissioning	0	0.00%	0	0.00%	2632	0.07%	\$22,555	0.11%
Lighting-Light Emitting Diode (LED)	225,550,736	83.35%	23,320	71.72%	0	0.00%	\$9,085,302	44.38%
Motors & Drives-Motor	9,960	0.00%	2	0.01%	0	0.00%	\$750	0.00%
New Construction-Energy Design	4,300,760	1.59%	955	2.94%	486,326	12.91%	\$1,569,208	7.66%
Other-Bonus	0	0.00%	0	0.00%	0	0.00%	\$342,851	1.67%
Other-Other	0	0.00%	0	0.00%	9	0.00%	\$1,025	0.01%
Renewable Energy-Geothermal	352,303	0.13%	76	0.23%	0	0.00%	\$55,500	0.27%
Renewable Energy-Photovoltaics	20,111,281	7.43%	6744	20.74%	0	0.00%	\$1,377,576	6.73%
Vending and Plug Loads-Controls	154,763	0.06%	20	0.06%	0	0.00%	\$27,497	0.13%

Table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 totals.

Table E-6 lists CY 2021 nonresidential savings by measure category.

Table E-6. Summary of First-Year Annual Savings by Measure Category, Nonresidential Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Aeration	2,713,804	0.64%	258	0.44%	0	0.00%	\$132,192.68	0.44%
Air Sealing	0	0.00%	0	0.00%	8,992	0.06%	\$3,085.00	0.01%
Biogas	627,691	0.15%	0	0.00%	0	0.00%	\$56,923.00	0.52%
Boiler	-244,927	-0.06%	-28	-0.05%	2,255,686	13.89%	\$1,865,477.00	6.20%
Bonus	0	0.00%	0	0.00%	0	0.00%	\$738,012.65	2.45%
Chiller	3,099,607	0.73%	718	1.21%	0	0.00%	\$327,569.04	1.09%
Compressor	10,119,817	2.37%	1445	2.43%	0	0.00%	\$276,780.00	0.92%
Controls	16,347,897	3.83%	1392	2.34%	1,400,507	8.62%	\$1,174,461.34	3.90%
Delamping	20,374	0.00%	3	0.01%	0	0.00%	\$334.00	0.00%
Design	23,313,045	5.46%	4434	7.47%	1,678,571	10.34%	\$3,508,529.26	11.66%
Direct Fired Heating	0	0.00%	0	0.00%	74,844	0.46%	\$57,804.25	0.19%
Dryer	433,187	0.10%	57	0.10%	170,436	1.05%	\$392,874.30	1.31%
Economizer	143,866	0.03%	2	0.00%	0	0.00%	\$3,800.00	0.01%
Energy Recovery	-1,656,820	-0.39%	-117	-0.20%	4,058,692	24.99%	\$2,068,281.24	6.87%
Fan	6,651,840	1.56%	1160	1.95%	45,662	0.28%	\$352,665.56	1.17%
Filtration	-193,201	-0.05%	-7	-0.01%	580,933	3.58%	\$367,659.30	1.22%
Furnace	33,678	0.01%	0	0.00%	117,271	0.72%	\$116,080.00	0.39%
Grain Dryer	2,036	0.00%	0	0.00%	3,439	0.02%	\$2,833.48	0.01%
Greenhouse	0	0.00%	0	0.00%	2,298	0.01%	\$259.20	0.00%
Heat Exchanger	1,875,487	0.44%	0	0.00%	0	0.00%	\$115,070.88	0.38%
Infrared Heater	0	0.00%	0	0.00%	11,534	0.07%	\$12,407.00	0.04%
Insulation	571	0.00%	0	0.00%	121,177	0.75%	\$72,866.13	0.24%
Irrigation	28,630	0.01%	20	0.03%	0	0.00%	\$2,600.00	0.01%
Light Emitting Diode (LED)	188916,869	44.23%	26077	43.92%	0	0.00%	\$8,598,684.37	28.57%
Livestock Waterer	673849	0.16%	0	0.00%	0	0.00%	\$19,520.00	0.06%
Motor	3,594,566	0.84%	424	0.71%	0	0.00%	\$92,925.00	0.31%
Other	48,233,661	11.29%	5092	8.57%	4,324,194	26.62%	\$4,351,598.36	14.46%

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Outside Air Intake	169,711	0.04%	19	0.03%	0	0.00%	\$8,731.44	0.03%
Packaged Terminal Unit (PTAC, PTHP)	925,328	0.22%	50	0.08%	0	0.00%	\$33,210.00	0.11%
Photovoltaics	15,607,728	3.65%	5203	8.76%	0	0.00%	\$1,974,631.61	6.56%
Process Heat	2,832	0.00%	1	0.00%	0	0.00%	\$399.00	0.00%
Pump	1,793,451	0.42%	217	0.36%	0	0.00%	\$85,401.39	0.28%
Reconfigure Equipment	2,701,652	0.63%	540	0.91%	0	0.00%	\$139,378.06	0.46%
Refrigerated Case Door	1,914,781	0.45%	256	0.43%	148,872	0.92%	\$116,872.00	0.39%
Rooftop Unit/Split System AC	769,493	0.18%	417	0.70%	123,242	0.76%	\$154,256.82	0.51%
Scheduling	3,106,674	0.73%	446	0.75%	148,250	0.91%	\$252,730.56	0.84%
Specialty Pulp & Paper	4,074,847	0.95%	482	0.81%	0	0.00%	\$161,775.00	0.54%
Steam Trap	0	0.00%	0	0.00%	426,789	2.63%	\$44,107.92	0.15%
Strip Curtain	945	0.00%	0	0.00%	0	0.00%	\$15.00	0.00%
Supporting Equipment	401,391	0.09%	46	0.08%	0	0.00%	\$20,637.64	0.07%
System Isolation	189,545	0.04%	13	0.02%	0	0.00%	\$6,124.90	0.02%
Tune-up/Repair/Commissioning	6,984,034	1.64%	0	0.00%	349,774	2.15%	\$123,213.07	0.41%
Unit Heater	0	0.00%	0	0.00%	20,728	0.13%	\$13,370.00	0.04%
Variable Speed Drive	79,341,285	18.58%	10002	16.84%	0	0.00%	\$1,538,103.18	5.11%
Water Heater	0	0.00%	0	0.00%	45,067	0.28%	\$53,587.60	0.18%
Energy Design	4,339,141	1.02%	750	1.26%	111,603	0.69%	\$523,118.91	1.74%
Wind Electric	67,378	0.02%	8	0.01%	0	0.00%	\$33,689.00	0.11%
Window	0	0.00%	0	0.00%	12,610	0.08%	\$4,754.24	0.02%

Table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 totals.

Table E-7 lists CY 2021 midstream savings by measure category.

Table E-7. Summary of First-Year Annual Savings by Measure Category, Midstream Channel

Measure Category	Verified Gross						Incentive Dollars	Incentive Dollars %
	kWh	kWh %	kW	kW %	therms	therms %		
Dishwasher, Commercial	791,712	27.68%	39	14.65%	1,048	0.27%	\$28,750.00	4.00%
Domestic Hot Water-Water Heater	4,968	0.17%	0	0.09%	333	0.09%	\$4,500.00	0.63%
Fryer	2,055	0.07%	0	0.16%	116,994	30.40%	\$129,625.00	18.04%
Griddle	0	0.00%	0	0.00%	100	0.03%	\$150.00	0.02%
Hot Holding Cabinet	6,022	0.21%	1	0.38%	0	0.00%	\$600.00	0.08%
HVAC-Other ^a	1,571,766	54.96%	90	34.24%	230,183	59.81%	\$453,000.00	63.04%
Ice Machine	30,225	1.06%	3	1.31%	0	0.00%	\$1,350.00	0.19%
Other	96,447	3.37%	10	3.93%	8,949	2.33%	\$19,500.00	2.71%
Oven	71,286	2.49%	17	6.27%	12,741	3.31%	\$19,250.00	2.68%
Refrigerator/Freezer - Commercial	7,294	0.26%	1	0.32%	0	0.00%	\$1,950.00	0.27%
Steamer	62,194	2.17%	95	36.27%	14,520	3.77%	\$21,500.00	2.99%
Variable Speed Drive	215,928	7.55%	6	2.40%	0	0.00%	\$38,400.00	5.34%

Table does not include adjustment measure records. As a result, this sum will not match with other CY 2021 overall totals.

^a HVAC-Other in the Midstream Channel is made up exclusively of ductless minisplit heat pumps,

Table E-8 lists CY 2021 residential lifecycle savings by measure category.

Table E-8. Summary of Lifecycle Savings by Measure Category, Residential Channel

Measure Category	Verified Gross			
	kWh	kWh %	therms	therms %
Boilers & Burners-Boiler	-	0.00%	3,153,424	4.85%
Boilers & Burners-Controls	113,750	0.00%	15,400	0.02%
Boilers & Burners-Tune-up/Repair/Commissioning	-	0.00%	740	0.00%
Building Shell-Air Sealing	2,199,118	0.08%	416,122	0.64%
Building Shell-Bonus	-	0.00%	-	0.00%
Building Shell-Insulation	36,623,430	1.30%	7,691,728	11.82%
Domestic Hot Water-Aeration	10,812,216	0.38%	2,130,206	3.27%
Domestic Hot Water-Bonus	-	0.00%	-	0.00%
Domestic Hot Water-Insulation	29,973,754	1.06%	3,578,210	5.50%
Domestic Hot Water-Other	1,711,228	0.06%	704,693	1.08%
Domestic Hot Water-Showerhead	18,077,069	0.64%	3,575,915	5.50%
Domestic Hot Water-Water Heater	-	0.00%	298,560	0.46%
HVAC-Air Conditioner - Residential	4,413	0.00%	-	0.00%
HVAC-Bonus	-	0.00%	-	0.00%
HVAC-Controls	111,871,697	3.97%	7,733,393	11.89%
HVAC-Furnace	58,997,790	2.09%	19,027,105	29.24%
HVAC-Other	-19,619,982	-0.70%	2,145,528	3.30%
HVAC-Packaged Terminal Unit (PTAC, PTHP)	1,016,025	0.04%	-	0.00%
HVAC-Rooftop Unit/Split System AC	3,049,719	0.11%	-	0.00%
HVAC-Tune-up/Repair/Commissioning	-	0.00%	5,264	0.01%
Lighting-Light emitting diode (LED)	1,924,322,110	68.30%	-	0.00%
Motors & Drives-Motor	179,280	0.01%	-	0.00%
New Construction-Energy Design	128,995,699	4.58%	14,589,788	22.42%
Other-Bonus	-	0.00%	-	0.00%
Other-Other	-	0.00%	180	0.00%
Renewable Energy-Geothermal	5,284,545	0.19%	-	0.00%
Renewable Energy-Photovoltaics	502,782,023	17.85%	-	0.00%
Vending and Plug Loads-Controls	928,577	0.03%	-	0.00%

Table E-9 lists CY 2021 nonresidential lifecycle savings by measure category.

Table E-9. Summary of Lifecycle Savings by Measure Category, Nonresidential Channel

Measure Category	Verified Gross			
	kWh	kWh %	therms	therms %
Aeration	53,894,590	0.83%	-	0.00%
Air Sealing	-	0.00%	93,800	0.03%
Biogas	12,553,820	0.19%	-	0.00%
Boiler	-11,511,560	-0.18%	61,778,489	22.58%
Bonus	-	0.00%	-	0.00%
Chiller	61,945,140	0.95%	-	0.00%
Compressor	151,803,540	2.34%	-	0.00%
Controls	187,750,620	2.89%	20,732,351	7.58%
Delamping	203,740	0.00%	-	0.00%
Design	466,260,900	7.18%	33,571,415	12.27%
Direct Fired Heating	-	0.00%	1,122,660	0.41%
Dryer	7,051,348	0.11%	3,737,629	1.37%
Economizer	1,438,660	0.02%	-	0.00%
Energy Recovery	-25,474,851	-0.39%	62,010,531	22.67%
Fan	101,060,622	1.56%	696,495	0.25%
Filtration	(4,882,815)	-0.08%	8,887,215	3.25%
Furnace	606,217	0.01%	2,110,878	0.77%
Grain Dryer	41,140	0.00%	68,780	0.03%
Greenhouse	-	0.00%	22,980	0.01%
Heat Exchanger	28,416,465	0.44%	-	0.00%
Infrared Heater	-	0.00%	173,262	0.06%
Insulation	14,275	0.00%	1,793,749	0.66%
Irrigation	433,785	0.01%	-	0.00%
Light Emitting Diode (LED)	2,816,635,171	43.37%	-	0.00%
Livestock Waterer	6,806,560	0.10%	-	0.00%
Motor	54,304,868	0.84%	-	0.00%
Other	678,108,501	10.44%	64,240,469	23.48%
Outside Air Intake	1,697,110	0.03%	-	0.00%
Packaged Terminal Unit (PTAC, PTHP)	13,879,924	0.21%	-	0.00%
Photovoltaics	390,193,207	6.01%	-	0.00%
Process Heat	42,480	0.00%	-	0.00%
Pump	26,901,765	0.41%	-	0.00%
Reconfigure Equipment	31,669,195	0.49%	-	0.00%
Refrigerated Case Door	23,435,166	0.36%	2,233,080	0.82%
Rooftop Unit/Split System AC	11,500,145	0.18%	1,825,965	0.67%
Scheduling	42,838,290	0.66%	2,081,960	0.76%
Specialty Pulp & Paper	61,122,705	0.94%	-	0.00%
Steam Trap	-	0.00%	2,595,953	0.95%
Strip Curtain	3,780	0.00%	-	0.00%

Measure Category	Verified Gross			
	kWh	kWh %	therms	therms %
Supporting Equipment	8,027,820	0.12%	-	0.00%
System Isolation	2,843,175	0.04%	-	0.00%
Tune-up/Repair/Commissioning	13,448,096	0.21%	349,774	0.13%
Unit Heater	-	0.00%	311,049	0.11%
Variable Speed Drive	1,190,931,275	18.34%	-	0.00%
Water Heater	-	0.00%	662,095	0.24%
Energy Design	86,782,816	1.34%	2,232,050	0.82%
Wind Electric	1,347,560	0.02%	-	0.00%
Window	-	0.00%	252,200	0.09%

Table E-10 lists CY 2021 midstream lifecycle savings by measure category.

Table E-10. Summary of Lifecycle Savings by Measure Category, Midstream Channel

Measure Category	Verified Gross			
	kWh	kWh %	therms	therms %
Dishwasher, Commercial	7,917,120	18.27%	10,480	0.17%
Domestic Hot Water-Water Heater	64,584	0.15%	4,329	0.07%
Fryer	24,660	0.06%	1,403,928	23.20%
Griddle	-	0.00%	1,200	0.02%
Hot Holding Cabinet	72,264	0.17%	-	0.00%
HVAC-Other ^a	28,291,789	65.28%	4,143,301	68.47%
Ice Machine	302,250	0.70%	-	0.00%
Other	1,736,045	4.01%	161,075	2.66%
Oven	855,432	1.97%	152,892	2.53%
Refrigerator/Freezer - Commercial	87,528	0.20%	-	0.00%
Steamer	746,328	1.72%	174,240	2.88%
Variable Speed Drive	3,238,920	7.47%	-	0.00%

^a HVAC-Other in the Midstream Channel is made up exclusively of ductless minisplit heat pumps.

Appendix F. Measure Analysis

This appendix describes the analyses of measures delivered by specific Focus on Energy offerings during CY 2021. It describes the methodologies the evaluation team followed and the results of the evaluation.

The evaluation team estimated LED per-bulb savings in the Retail Offering. The team also analyzed realization rates for a sample of projects from these nonresidential offerings—Large Industrial, Commercial and Industrial, Agribusiness, Schools, Government, New Construction Prescriptive, New Construction Design Assistance/Review, and Renewable Energy Competitive Incentive Program (RECIP).

Direct to Customer Solutions: Retail, Rural Retail Events, and Online Marketplace Lighting Analysis

In CY 2021, the evaluation team estimated LED per-bulb savings for Retail, Rural Retail Events, and Online Marketplace offerings using the lumen equivalence methodology to determine baseline wattages and other inputs from the 2021 Wisconsin Technical Reference Manual (TRM).

Unit Energy Savings Input Details

Table F-1 shows the values used to calculate verified gross savings. The evaluation team used items in the rows under the unit savings inputs heading to calculate savings for individual bulbs and applied the items in the rows under the total savings inputs heading to aggregated savings.

Table F-1. CY 2021 Lighting Verified Gross Inputs

Input	Description	Offering	Residential Value	Nonresidential Value	Units	Source
Unit Savings Inputs						
Hours of Use (HOU)	Hours of use: daily average use LEDs	Retail	2.20	10.20	Hours/day	2021 TRM
		Online Marketplace	SF: 2.27 MF: 2.01	N/A		
ISR _{LED}	In-service rate: percentage of LEDs installed	All	Varies	Varies	%	2021 TRM and 2020 Participant Survey.
Δwatts	Delta watts: difference in wattage between the efficient and baseline bulb	All	Varies	Varies	W	Wisconsin CY 2021 lumen equivalence analysis
CF	Coincidence factor: summer peak coincidence factor	Retail	0.070	0.770	-	2021 TRM
		Online Marketplace	SF: 0.075 MF: 0.055	N/A		
365	Days per year: conversion to annualize the daily hours of use	All	365	365	Days/year	2021 TRM
Total Savings Inputs						
Cross-Sector Sales	Cross-sector sales: percentage of bulbs sales allocated to residential and nonresidential sector	Retail	93.4	6.6	%	Wisconsin CY 2015 cross-sector sales analysis
EUL _{LED}	Effective useful life (EUL): average life of a LED bulb	All	GSL = 7 Specialty = 9 IQ = 11	GSL = 7 Specialty = 9	Years	2021 TRM

Table F-2 lists the measure-specific in-service rates (ISRs) the evaluation team applied to all LED measures.

Table F-2. CY 2021 Lighting Verified In-Service Rates

Offering	Measure Name	Verified First-Year ISR	Verified Lifetime ISR	Verified ISR Source	Ex Ante ISR
Retail – Retail Lighting	All LEDs	56%	87%	TRM	87%
Retail – Income Qualified	All LEDs	N/A	78%	TRM	78%
Retail - Pop-Up Retail Rural Retail Events	LED A-Line 60W Equivalent	72%	92%	CY 2020 participant survey	87%
	LED A-Line 75W Equivalent	67%	90%		87%
	LED A-Line 100W Equivalent	58%	88%		87%
	LED A-Line High Wattage ^a	65%	90%	CY 2020 participant survey average of other lamp types	87%
	LED 3-Way	57%	88%	CY 2020 participant survey	87%
	LED Candelabra	59%	88%		87%
	LED Globe	61%	89%		87%
	LED Reflector	64%	90%		87%
	LED Desk Lamp	80%	94%		87%
	Online Marketplace	LED, Omnidirectional, Standard, Online Store	SF: 59% MF: 50%	SF: 86% MF: 84%	CY 2021 participant survey
LED, Reflector, Online Store		SF: 58% MF: 38%	SF: 86% MF: 80%	87%	
LED, Globe, Online Store		SF: 53% MF: 66%	SF: 85% MF: 88%	87%	
LED, Decorative, Online Store		SF: 61% MF: 50%	SF: 87% MF: 84%	87%	
LED, 3-way, Online Store		SF: 61% MF: 50%	SF: 87% MF: 84%	87%	

^a New for CY 2021, so this measure was not included in the 2020 survey.

In the Retail Offering, verified inputs for Retail Lighting savings include 6.6% cross-sector sales to account for program bulbs sold through participating retailers that were installed in nonresidential locations. To determine verified savings, the evaluation team calculated residential and nonresidential savings independently then used this percentage to weight the savings for each residential and nonresidential measure.

For Pop-Up Retail and Income Qualified offerings, the evaluation team only applied residential savings. The team assumes that bulbs distributed through income-qualified channels will be installed only in homes, and the CY 2020 Pop-Up Retail participant survey found that participants installed bulbs only in residential applications.

Table F-3 shows the weighted verified savings for the Retail Lighting Offering.

Table F-3. CY 2021 Retail Lighting Offering Weighted Verified Gross Unit Savings

Measure	kWh	kW
LED, Reflector	43	0.005
LED, Globe	29	0.003
LED, Decorative	30	0.003
LED, 3-Way	67	0.008
LED, Omnidirectional, 310–749 Lumens	18	0.002
LED, Omnidirectional, 750–1,049 Lumens	25	0.003
LED, Omnidirectional, 1,050–1,489 Lumens	34	0.004
LED, Omnidirectional, 1,490–2,600 Lumens	45	0.005
LED, Omnidirectional, 2,601–5,000 Lumens	110	0.013

Notes: No natural gas savings are claimed for the offering. Unit savings are weighted by the evaluated cross-sector sales percentage.

LEDs distributed through Rural Pop-Up Events use the same inputs as Pop-Up Events in the Retail Offering. Therefore, the team applied residential savings only to bulbs in the Rural Retail Events Offering.

CY 2021 participant survey of the Online Marketplace Offering also found that participants installed bulbs only in residential applications. Therefore, the evaluation team applied residential savings only to bulbs distributed through the Online Marketplace.

Table F-4 shows the verified residential savings for Rural Retail Events and Online Marketplace Offerings.

Table F-4. CY 2021 Pop-Up Retail, Rural Retail Events, and Online Marketplace Verified Gross Unit Savings

Offering	Measure	kWh	kW
Rural Retail Events	LED, Reflector	36	0.003
	LED, Globe	27	0.002
	LED, Decorative	26	0.002
	LED, 3-Way	59	0.005
	LED, Omnidirectional, 310–749 Lumens	17	0.001
	LED, Omnidirectional, 750–1,049 Lumens	25	0.002
	LED, Omnidirectional, 1,050–1,489 Lumens	29	0.003
	LED, Omnidirectional, 1,490–2,600 Lumens	41	0.004
	LED, Omnidirectional, 2,601–5,000 Lumens	110	0.010
Online Marketplace	LED, Reflector, Online Store	SF: 42 MF: 37	SF: 0.0038 MF: 0.0028
	LED, Globe, Online Store	SF: 30 MF: 26	SF: 0.0027 MF: 0.0020
	LED, Decorative, Online Store	SF: 30 MF: 26	SF: 0.0027 MF: 0.0020
	LED, 3-way, Online Store	SF: 70 MF: 62	SF: 0.0063 MF: 0.0046
	LED, Omnidirectional, 310-749 Lumens, Online Store	SF: 17 MF: 15	SF: 0.0016 MF: 0.0011
	LED, Omnidirectional, 750-1,049 Lumens, Online Store	SF: 28 MF: 25	SF: 0.0026 MF: 0.0019
	LED, Omnidirectional, 1,050-1,489 Lumens, Online Store	SF: 30 MF: 26	SF: 0.0027 MF: 0.0020
	LED, Omnidirectional, 1,490-2,600 Lumens, Online Store	SF: 47 MF: 42	SF: 0.0043 MF: 0.0031
	LED, Omnidirectional, 310-749 Lumens Filament, Online Store	SF: 34 MF: 30	SF: 0.0031 MF: 0.0022

Table F-5 provides baseline and efficient wattages and the corresponding delta watts for the Retail Offering, Rural Retail Events, and Online Marketplace *ex ante* and verified savings.

Table F-5. Retail, Rural Retail Events, and Online Marketplace *Ex Ante* and Verified Delta Watts Comparison

Offering	Measure	<i>Ex Ante</i> Baseline	Average Evaluated Baseline	Bulb Wattage		Delta Watts	
				<i>Ex Ante</i>	Average	<i>Ex Ante</i>	Average Evaluated
Retail	LED, Reflector	61	60	9	9	52	50
	LED, Globe	39	40	5	5	35	35
	LED, Decorative	45	42	4	4	41	38
	LED, 3-Way	61	94	15	16	46	78
	LED, Omnidirectional, 310–749 Lumens	29	29	6	6	23	23
	LED, Omnidirectional, 750–1,049 Lumens	43	43	9	9	34	34
	LED, Omnidirectional, 1,050–1,489 Lumens	53	53	11	10	42	43
	LED, Omnidirectional, 1,490–2,600 Lumens	58	72	13	15	56	57
	LED, Omnidirectional, 2,601–5,000 Lumens	61	155	9	26	97	129
Rural Retail Events	LED, Reflector	61	62	9	11	52	50
	LED, Globe	39	43	5	6	35	37
	LED, Decorative	45	40	4	4	41	36
	LED, 3-Way	61	100	15	16	46	84
	LED, Omnidirectional, 310–749 Lumens	29	25	6	3	23	22
	LED, Omnidirectional, 750–1,049 Lumens	43	43	9	9	34	34
	LED, Omnidirectional, 1,050–1,489 Lumens	53	53	11	13	42	40
	LED, Omnidirectional, 1,490–2,600 Lumens	58	72	13	15	56	57
	LED, Omnidirectional, 2,601–5,000 Lumens	61	183	9	31	97	152
Online Marketplace	LED, Reflector	61	60	9	9	52	51.1
	LED, Globe	39	40	5	5	35	36.0
	LED, Decorative	45	42	4	4	41	36.0
	LED, 3-Way	61	94	15	16	46	84.0
	LED, Omnidirectional, 310–749 Lumens	29	29	6	6	23	40.9
	LED, Omnidirectional, 750–1,049 Lumens	43	43	9	9	34	34.1
	LED, Omnidirectional, 1,050–1,489 Lumens	53	53	11	10	42	35.9
	LED, Omnidirectional, 1,490–2,600 Lumens	58	72	13	15	56	57.0

Delta Watts Lumens Bins

This section provides details related to lumen bins, which the evaluation team used for calculating verified delta watts inputs. The lumen bins for specialty bulbs shown in Table F-6, Table F-7, and Table F-8 are derived from the U.S. Department of Energy Uniform Methods Project (UMP).⁹ The baselines are derived from the Energy Independence and Security Act (EISA).

Table F-6. Globe Lumen Bins

Bin	Baseline (EISA-Impacted Bulbs)
250–349	25
350–499	29
500–574	43
575–649	53
650–1,099	72
1,100–1,300	72

Table F-7. Decorative Shape (Candles) Lumen Bins

Bin	Baseline (EISA-Impacted Bulbs)
70–89	10
90–149	15
150–299	25
300–499	29
500–699	43

Table F-8. Three-Way, Post Lamps, and Other Similar Bulbs Lumen Bins

Bin	Baseline (EISA-Exempt Bulbs)
0–309	25
310–449	25
450–799	40
800–1099	60
1,100–1,599	75
1,600–1,999	100
2,000–2,600	150
2,601–3,300	150
3,301–4,815	200

⁹ National Renewable Energy Laboratory. 2015. “Chapter 21: Residential Lighting Evaluation Protocol.” *Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. <https://www.energy.gov/sites/prod/files/2015/02/f19/UMPCchapter21-residential-lighting-evaluation-protocol.pdf>

Nonresidential Solutions: Project Details from Sampled Projects

The evaluation team performed desk reviews and on-site verification reviews of a sample of projects in each nonresidential solution: Business and Industry, New Construction, Schools and Government, and Renewable Energy Competitive Incentive. The team calculated measure-level realization rates based on the analysis completed for these sample projects, which informed the offering- and solution-level realization rates for CY 2021. A more detailed description of the sampled projects follows.

Large Industrial Offering (Business and Industry Solution)

The evaluation team found several discrepancies in realization rates for sampled projects in the CY 2021 Large Industrial Offering. In the impact sample, 53 of 63 projects achieved a 100% energy realization rate. Of those with discrepancies, two projects deviated significantly, defined as greater than 20% away from 100% realization rate. One project had a realization rate of 139% (greater than 120%), and one project had a realization rate of 69% (below 80%). Specific details related to projects with discrepancies are provided in Table F-9. Projects are designated by their master measure identifier (MMID).

Table F-9. CY 2021 Large Industrial Offering Sample Detailed Projects

MMID	Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
2499	Process, Not Otherwise Specified	646,086	654,272	101%	3%	The reported calculation used the average proposed efficiency within the range of values; this was updated to be slightly lower based on conversations with facility staff and assumed less need for heavy airflow due to the upgrade.
2220	Boiler, Not Otherwise Specified	2,777,540	2,712,658	98%	13%	The measure savings were adjusted to reflect the data collected on project ramp-up schedule. Biogas data were provided that showed the project was not at the projected 40% ramp-up but is currently at 24% and, consequentially, flaring off most of its production. If the flared product was used, project would be much closer to 100% realization rate. First-year therm savings were reduced significantly to 59% of <i>ex ante</i> realization rate. The remaining 19 years of expected useful life (EUL) were unmodified, resulting in a lifecycle therm realization rate of 98%.
3741	LED Fixture, Linear Ambient, Replacing 3 or 4 T8/12 lamps	31	43	139%	0%	Spectrum Application Created Date is 2/1/2021, indicating the 2020 TRM should have been used. Reported calculations referenced the 2021 TRM. Evaluated calculations referenced the 2020 TRM.

MMID	Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
2647	Variable Frequency Drive (VFD), Process Fan	1,743	1,203	69%	0%	On-site visit to facility found that motor nameplate indicates lower efficiency motor than specified in documentation. Two boilers are redundant to each other; only one runs at a time, never both together. They replaced two 250 hp boilers with two 500 hp boilers, one in 2020 and one in 2021. Upgraded sizing was for redundancy only. Original calculations indicate a run time of 6,000 annual hours. Customer and trend data indicate the collective boiler run time is between 7,500-8,100 hours annually, depending on overtime production. Considering load is split between the redundant boilers for this single boiler and single VFD motor attributed to this measure, run time is half the total (4,050), reducing savings claimed.
2257	Compressed Air Heat Recovery, Space Heating	15,600	15,714	101%	0%	For reported values, the inputs into the prescriptive equation appear to be rounded off. For evaluated values, inputs were entered as published, but final annual therm savings result was rounded off. Additionally, the inputs to the prescriptive saving calculation for MMID 2257 for <i>ex ante</i> savings reflect a units error found in the TRM. This error was passed through in the verified savings.
3393	LED Fixture, <=180 watts, Replacing 4 lamp T5 or 6 lamp T8, High Bay	300	301	101%	0%	Not clear where discrepancy stems from, assume slight rounding error on input values.
3622	Water-Related Energy Savings	3,901	3,557	91%	0%	The flow used to calculate energy savings was originally hardcoded and calculated incorrectly. The flow value was updated to be linked to the actual calculated flow, which reduced savings slightly.
2257	Compressed Air Heat Recovery, Space Heating	5,850	5,894	101%	0%	The inputs into the prescriptive savings calculation appeared to have been rounded off in the reported savings. The evaluated savings did not round any inputs into annual therm savings. Additionally, the inputs to the prescriptive saving calculation for MMID 2257 for <i>ex ante</i> savings reflect a units error found in the TRM. This error was passed through in the verified savings.

MMID	Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
2648	VFD, Process Pump	150	143	96%	0%	Virtual site visit conducted with customer. Customer said production line is not scheduled to ramp up to full production until next year. For evaluated savings, annual kWh savings for the first year of the 15-year EUL was adjusted to reflect current production level. The annual kWh savings calculation for the subsequent 14 years has not been modified and reflects the full production originally estimated in reported calculations. Result is a significantly reduced first-year kWh savings, but a very slightly reduced lifecycle kWh savings.
3740	LED Fixture, Linear Ambient, Replacing 1 or 2 T8/T12 lamp(s)	283	286	101%	0%	Project measure split between prescriptive and custom; custom process used to determine <i>ex ante</i> savings. Slight modifications made to wattages and hours of use, and slight rounding errors resulted in slightly higher <i>ex post</i> savings for prescriptive portion (sampled portion) of the project measure.

Commercial and Industrial Offering (Business and Industry Solution)

The evaluation team found several discrepancies in realization rates for sampled projects in the CY 2021 Commercial and Industrial Offering. In the impact sample, 84 of 96 projects achieved a 100% energy realization rate. Of projects with discrepancies, none had realization rates greater than 120%, and three had realization rates below 80%. Specific details related to projects with discrepancies are provided in Table F-10.

Table F-10. CY 2021 Commercial and Industrial Offering Sample Detailed Projects

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
285	Ventilation Filtration vs Make Up Air System	153,213	154,470	101%	2%	Virtual site visit conducted with customer. In evaluated savings calculation, efficiency of exhaust fan motor was modified to 92.4%, and fan exponent was modified from 2.5 to 2.7 to reflect nameplate information, resulting in an increase in kW and kWh savings.
3393	LED Fixture, <=180 watts, Replacing 4 lamp T5 or 6 lamp T8, High Bay	1,969	2,247	114%	0%	SPECTRUM application created date is 3/26/2021, indicating the 2020 TRM should have been used. Reported used 2021 TRM. Evaluation used 2020 TRM.
4282	LED, Exterior Fixture, High Output, 10,000-29,999 lumens	3,042	2,904	95%	0%	SPECTRUM application created date is 2/1/2021, indicating the 2020 TRM should have been used. Reported used 2021 TRM. Evaluation used 2020 TRM.
4282	LED, Exterior Fixture, High	961	917	95%	0%	SPECTRUM application created date is 4/13/2021, indicating the 2020 TRM should have

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
	Output, 10,000-29,999 lumens					been used. Reported used 2021 TRM. Evaluation used 2020 TRM.
4375	Smart Thermostat, Natural Gas Boiler	469	464	99%	0%	Inputs into prescriptive equation appear to have been rounded off in reported calculations. The evaluated savings calculation did not round off any inputs.
4282	LED, Exterior Fixture, High Output, 10,000-29,999 lumens	560	535	95%	0%	SPECTRUM application created date is 2/8/2021, indicating the 2020 TRM should have been used. Reported used 2021 TRM. Evaluation used 2020 TRM.
3741	LED Fixture, Linear Ambient, Replacing 3 or 4 T8/12 lamps	82	72	88%	0%	SPECTRUM application created date is 2/19/2021, indicating the 2020 TRM should have been used. Reported used 2021 TRM. Evaluation used 2020 TRM.
2456	LED, Reach-In Refrigerated Case, Replaces T12 or T8	310	303	98%	0%	Inputs into prescriptive equation appear to have been rounded off in reported calculations. The evaluated savings calculation did not round off any inputs.
3400	LED Fixture, 2x2, Low Output	9	7	79%	0%	Origin of reported savings calculation unknown; neither the 2020 or 2021 TRM calculation matches the reported result. Evaluated savings were calculated using the MMID deemed values in the 2021 TRM given SPECTRUM application creation date of 11/5/2021.
3276	Boiler, Hot Water, Condensing, >=90% AFUE, >=300 MBH	11,628	4,526	39%	0%	On-site visit found two condensing boilers as specified installed. However, customer said one is redundant, only one runs at a time; confirmed by programming of units. Programming also confirmed that fixed-supply and return temperatures will not result in achievement of a condensing state. Evaluated savings reduced MMBtu to reflect only one of the two units, and the measure for a near condensing boiler was used to determine savings. Conservatively, the efficiency of the unit was not modified from specification.
3400	LED Fixture, 2x2, Low Output	95	75	79%	0%	Origin of reported savings calculation unknown; neither 2020 or 2021 TRM calculation matches the reported result. Evaluated savings were calculated using the MMID deemed values in the 2021 TRM given a SPECTRUM application creation date of 7/13/2021.
2269	Cooler Evaporator Fan Control	235	256	109%	0%	Reported savings were adjusted to reflect 8,760 operating hours reported by customer.

Agribusiness Offering (Business and Industry Solution)

The evaluation team found few discrepancies in realization rates for sampled projects in the CY 2021 Agribusiness Offering. In the impact sample, 24 of 27 projects achieved a 100% energy realization rate. Of those with discrepancies, one site had a realization rate greater than 120%, and no sites had realization rates below 80%.

Specific details related to projects with significant or impactful discrepancies are provided in Table F-11.

Table F-11. CY 2021 Agribusiness Offering Sample Detailed Projects

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
4697	LED Fixture, <250 watts, Replacing 400 Watt HID, High Bay, Agriculture	62	96	156%	0%	The application date of 2/15/2021 suggests the 2020 TRM should have been used. MMID 4697 does not exist in 2020 TRM. <i>Ex ante</i> savings appears to have used MMID 3093 in the 2020 TRM; however, description matches MMID 4697 in 2021 TRM, which was used for <i>ex post</i> savings.
3759	LED Replacement of 4â€™™ T8 Lamps, Direct Wire	221	230	104%	0%	MMID exists in both 2020 and 2021 TRM. Application creation date is 1/22/21; therefore, 2020 TRM values were used to calculate <i>ex post</i> savings.
4696	LED Fixture, <250 watts, Replacing 320-399 watts HID, High Bay, Agriculture	579	632	109%	0%	The application date of 1/29/2021 suggests the 2020 TRM should have been used. MMID 4696 does not exist in 2020 TRM. <i>Ex ante</i> savings appears to have used MMID 3093 in 2020 TRM; however, description matches 2021 MMID 4696, which was used for <i>ex post</i> savings.

Schools Offering (Schools and Government Solution)

The evaluation team found no discrepancies in realization rates for sampled projects in the CY 2021 Schools Offering in the Schools and Government Solution. All 18 projects achieved a 100% energy realization rate.

Table F-12. CY 2021 Schools Offering Sample Detailed Projects

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
2203	Boiler Burner, 10:1 High Turn Down	9,200	107,520	60%	4%	SPECTRUM application created date was 4/30/2020, so the evaluation team used 2021 TRM, which resulted in lower savings.
2203	Boiler Burner, 10:1 High Turn Down	9,200	107,520	60%	4%	SPECTRUM application created date was 3/30/2020, but the 2020 TRM was current resource at that time. However, MMID 2203 was not found in the 2020 TRM. It was found in the 2021 TRM, resulting in lower savings than reported. Evaluation team also checked the 2019 TRM but did not find MMID 2203.

Government Offering (Schools and Government Solution)

The evaluation team found a single discrepancy in realization rates for sampled projects in the CY 2021 Government Offering. In the impact sample, 21 of 22 projects achieved a 100% energy realization rate. The one project with discrepancy achieved a realization rate of 99.7%. Specific details related to projects with discrepancies are provided in Table F-13.

Table F-13. CY 2021 Government Offering Sample Detailed Projects

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
3962	LED Lamp, DLC, High/Low-Bay Mogul Screw-Base (E39)	1,649	1,644	99.7%	0%	Slight discrepancy in lifetime kWh savings. <i>Ex ante</i> appears to be using 42.12 kWh/watt reduced. The 2021 TRM gives 42.00 kWh/watt reduced.

Prescriptive Offering (New Construction Solution)

The evaluation team found discrepancies in realization rates for sampled projects in the CY 2021 Prescriptive Offering in the Nonresidential New Construction Solution. In the impact sample, 12 of 26 projects achieved a 100% energy realization rate. Of those with discrepancies, no sites had a realization rate greater than 120%, and three sites had realization rates below 80%. Specific details related to projects with significant or impactful discrepancies are provided in Table F-14.

Table F-14. CY 2021 Prescriptive Offering Sample Detailed Measures

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
4948	Interior New Construction Lighting; Lighting Power Density (LPD) Below Code	4,304	4,218	98%	0%	<i>Ex ante</i> savings calculations used an average of two different building area types (office and warehouse) to calculate the baseline LPD allowance value. This method was not correctly applied in this project. The office space accounts for only 4% of total building area, and warehouse makes up the remaining 96%. <i>Ex post</i> savings calculations used warehouse building area type only, which resulted in a lower baseline wattage allowance for the building and therefore lower savings achievement.
4736	A/C Split System, 65 MBh, SEER 15	24	16	68%	0%	This measure is assigned MMID 4736, which corresponds to an application in multifamily sector in both retrofit or new construction. This project is 100% new construction only, and these units serve common areas rather than residential spaces. Therefore, MMID 4740 is more appropriate for the commercial sector in new construction. Deemed savings for MMID 4740 were lower than for MMID 4736.
4948	Interior New Construction Lighting LPD	5,152	5,099	99%	0%	<i>Ex post</i> savings calculations used fixture quantities from invoices and fixture wattages from specification sheets, which resulted in a small difference from <i>ex ante</i> savings, which were based on COMcheck.

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
4942	Water Heater, High Usage >= 90% Thermal Efficiency, Tankless, NG	308	309	100.4%	0%	Small rounding error difference in <i>ex post</i> savings.
4356	LED Fixture, Downlights, Exterior	22	22	102%	0%	<i>Ex post</i> calculation for watts reduced was 18.3 watts/fixture, based on the difference between TRM baseline fixture wattage and efficient fixture wattage from project documentation. The audited value for watts reduced was 18.0 watts/fixture, and it was not clear how this value was derived.
4948	Interior New Construction Lighting LPD	3,569	3,219	90%	0%	The HOU used in the <i>ex ante</i> /audited calculations was a straight average of the HOU for each of the spaces (since different spaces throughout the facility have different schedules). This did not seem like the most accurate way to capture lighting hours across the facility. <i>Ex post</i> saving calculations used floor-area-weighted average HOU instead.
4948	Interior New Construction Lighting LPD	598	597	99.8%	0%	Small rounding error difference in <i>ex post</i> savings.
2314	Energy Recovery Ventilator (ERV)	5,560	5,547	99.8%	0%	According to photos provided by the site contact, the cooling efficiency of the units serving the space served by the ERV (11.7 EER) is higher than the value used in the <i>ex ante</i> calculations (10.6 EER).
4948	Interior New Construction Lighting LPD	3,081	1,651	54%	0%	The site contact said weekday operation of the facility is only in the evenings (2,548 hours/year), but the <i>ex ante</i> calculations assumed full day operation seven days/week (4,732 hours/year). Fewer hours of operation result in reduced savings.
4948	Interior New Construction Lighting LPD	2,287	2,372	104%	0%	Rounding error difference in watts/square foot LPDs led to different savings results.
4948	Interior New Construction Lighting LPD	92	91	99%	0%	Small rounding error difference in <i>ex post</i> savings.
4356	LED Fixture, Downlights, Exterior	117	115	98%	0%	Audited savings are based on 56 watts reduced/fixture. However, based on the fixture wattage listed in the ENERGY STAR fixture data, the wattage reduction is 54.9 watts/fixture. ENERGY STAR data appear to be the only fixture specification provided. <i>Ex Post</i> savings calculations used 54.9 watts/fixture reduction, which resulted in less savings.

Design Assistance/Review Offering (New Construction Solution)

The evaluation team found a few discrepancies in realization rates for sampled projects in the CY 2021 Energy Design Assistance/Review Offering in the Nonresidential New Construction Solution. In the impact sample, 15 of 20 projects achieved a 100% energy realization rate. Of those with discrepancies, all deviations were within 5% of 100% realization. Specific details related to projects with significant or impactful discrepancies are provided in Table F-15.

Table F-15. CY 2021 Design Assistance/Review Offering Sample Detailed Measures

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		Ex Ante	Ex Post			
2970	-Project Savings Verification	84,870	85,294	101%	1%	The verification report states that exterior lighting load was reduced further than planned (7.36 kW verified vs. 8.79 kW planned), resulting in increased savings, but model was not adjusted to reflect that value. <i>Ex post</i> savings reflect exterior lighting reduction stated in verification report.
4821	Project Savings Verification, Baseline 2015 IECC	92,367	86,367	94%	1%	Based on interview and photo documentation from site contact, boiler temperature reset did not appear to have been implemented as reported, so savings associated with this strategy should be removed. Because this strategy is modeled in combination with boiler efficiency strategy, which was implemented, adjustment was made to <i>ex post</i> savings using an external calculation based on individual modeled strategy results and the TRM.
5003	-EDA Project Savings Verification	3,123	3,112	99.7%	0%	<i>Ex post</i> natural gas therm savings are converted from modeled district energy consumption using the boiler efficiency observed on site. The boiler efficiency used in <i>ex ante</i> calculations was not reported in project documentation but appeared to be slightly higher than the efficiency verified on site. Miscellaneous equipment power density watts/square foot in the manufacturing spaces appeared to be modeled slightly higher in proposed case than in baseline case (2% difference). This does not overestimate savings, but this load should have been modeled identically between baseline and proposed cases, so this issue should be noted.
5004	-EDR Project Savings Verification	5,470	5,631	103%	0%	SPECTRUM savings differ from supporting documents and NEO model (which are consistent with each other). It is not clear why.

MMID	Project Measure	Lifecycle Savings (MMBtu)		Real. Rate	Share of Offering	Notes
		<i>Ex Ante</i>	<i>Ex Post</i>			
2970	– Project Savings Verification	433,397	413,011	95%	6%	Documentation for this project was inconsistent. The natural gas therm savings shown in model output reports did not agree with <i>ex ante</i> savings; proposed case modeled natural gas consumption was higher than reported in verification report. The <i>ex post</i> savings reflect the EnergyPlus model input/output report. Also, percentage of savings reported in the "List of Verified Strategies" Table in the verification summary report were not consistent with actual end-use savings according to the model output reports; for example, 50% of MMBtu savings in the model output report were from the service water heating end use, while the strategy Table shows that <1% of the savings will be attributed to service water heating.

RECIP Offering

The evaluation team did not find any discrepancies in realization rates for sampled projects in the CY 2021 RECIP Offering. In the impact sample, all six projects achieved a 100% energy realization rate.

Appendix G. Net Savings Analysis

For the CY 2021 evaluation of Focus on Energy’s offerings, the evaluation team applied net-to-gross (NTG) adjustments drawn mostly from primary research. This appendix presents two general approaches used to assess net savings—national sales data modeling and self-report NTG—and explains how they were applied to each offering.

Net Savings Overview

As described in Volume II, the evaluation of a solution and its offerings involves reviewing the reported gross savings to ensure that the measures installed have remained installed and are working as intended. The evaluation team then applies any adjustments found during that review to calculate verified gross savings.

Net savings are savings that would not have occurred in the absence of a given offering. These are the final savings attributed to an offering, as determined by an independent evaluator. To determine these savings, the evaluator deducts reported savings that are associated with freeriders (participants who would have undertaken the same action and achieved the same savings in the absence of an offering) and adds spillover savings (savings that are the result of an offering’s influence, but for which no incentive was paid and for which no offering has recorded savings).

Net savings represent the total savings achieved through the investment of ratepayer dollars into the offering. These net savings are the primary benefits factored into the benefit/cost analysis used to help design offerings and ensure that they are operating in a manner that returns a net positive benefit to ratepayers. Focus on Energy also uses net savings to track progress toward the savings targets established for it by the PSC.

This appendix discusses the specific approaches the evaluation team used to derive net savings for the CY 2021 Focus on Energy solutions and their offerings. Since CY 2013, the evaluation team has incorporated net savings estimation approaches that are driven by sales data or an experimental design as well as by survey results. One example of a data-driven approach is national sales data modeling, which measures the lift in retail sales resulting from the influence of the offering.

Focus on Energy’s long-term goals are to use these data-driven approaches as broadly as possible. The Evaluation Work Group approved the use of these approaches and supports expanding their use when evaluators can obtain reliable data with reasonable cost and effort.

The evaluation team conducted various NTG analysis methods to assess the performance of measures offered throughout the Focus on Energy portfolio. In some cases, the team combined methods to determine the savings-weighted average NTG ratios for each offering. Table G-1 shows the evaluation methods used to determine net savings for each offering for the CY 2021 evaluation.

Table G-1. CY 2021 Net Savings Methodology by Offering

CY 2021 Offerings	Net Savings Methodologies
Residential Offering	
Online Marketplace	CY 2021 Self-Report
Packs/Rural Farmhouse Kits	CY 2020 Self-Report from Packs participant surveys
Retail Lighting	National lighting sales model
Income-Qualified	Assumed 100% NTG
Pop-Up Retail/Rural Retail Events	CY 2020 Self-Report
Retail Products	CY 2020 Self-Report
Heating and Cooling (Tier 1)	CY 2020 Standard Market Practice and CY 2020 Self-Report
Heating and Cooling (Tier 2)	Assumed 1.0 NTG
Insulation and Air Sealing (Tier 1 and Tier 2)	CY 2020 Billing Analysis
Renewable Energy	CY 2021 Self-Report
Residential New Construction	CY 2019 Billing Analysis
Nonresidential Offering	
Agriculture	CY 2020 Self-Report
Commercial and Industrial	CY 2020 Self-Report
Large Industrial	CY 2020 Self-Report
Government	CY 2020 Self-Report
Schools	CY 2020 Self-Report
New Construction Design Assistance/Review	CY 2020 Self-Report
New Construction Prescriptive	CY 2020 Self-Report
Renewable Energy	CY 2021 Self-Report
Renewable Energy Competitive Incentive Program	CY 2019 Self-Report
Midstream Offering	
Midstream	Assumed 1.0 NTG

For CY 2021, the evaluation team updated NTG ratios from primary research for the Retail Lighting offering (using sales data), the Online Marketplace offering (using self-reported survey results), and Renewable Energy offerings (using self-reported survey results). For all other offerings, the team calculated net savings by applying historical NTG ratios or assuming an NTG of 1.0.

Retail Offering National Sales Data Modeling

The evaluation team estimated the CY 2020 NTG for LEDs sold through the upstream channel in the Retail Offering using a national sales data model, the same approach it used in CY 2020 and past evaluations. The underlying theory behind the national lighting sales data NTG model is that states with strong upstream lighting program activity—compared to those with little to no program activity—should have higher market share (via sales) of efficient lighting. The model relies on full-category lighting sales data to estimate market lift as a function of program activity, while also controlling for other factors (e.g., household and demographic characteristics) that might impact sales of efficient lighting. Based on this modeling, the evaluation team determined a comprehensive NTG estimate that captures freeridership, participant spillover, and nonparticipant spillover/market effects.

The primary objective of the model is to quantify the relationship between program intensity (e.g., program spending per household) and LED sales (percentage of light bulb purchases that are LEDs), which the model then uses to estimate an NTG ratio for the upstream lighting offering. This is the sixth year that Focus on Energy has used the sales data modeling approach for estimating lighting NTG. Though the CY 2015 model included all efficient lighting technologies (CFLs and LEDs), all models since then have focused exclusively on sales and market shares of LEDs. This reflects the dominance of LEDs as the preferred energy-efficient lighting technology and the substantial decrease in CFL sales.

In addition to estimating NTG, the data provide helpful insights into what other factors drive LED purchases and opportunities for benchmarking Wisconsin lighting efficiency shares and program spending against other states. This memo presents these additional analyses as well.

Data Sources

The evaluation team relied on a variety of data sources for the analysis, primarily sales data prepared by the Consortium for Retail Energy Efficiency Data (CREED).¹⁰ This consortium of program administrators, retailers, and manufacturers work together to collect the data necessary for better planning and evaluation of energy efficiency programs. LightTracker is CREED's first initiative, focused on acquiring full-category lighting data including incandescent, halogen, CFL, and LED bulb types for all distribution channels in the entire United States. As a consortium, CREED speaks as one voice for program administrators nationwide as they request, collect, and report on the sales data needed by the energy efficiency community.

The sales data were primarily generated from two sources: Point-of-sale (POS) state sales data (representing grocery, drug, dollar, discount, mass merchandiser, and selected club stores) and National Consumer Panel (NCP) state sales data (representing home improvement, hardware, online, and selected club stores). The evaluation team also purchased raw datasets from third-party vendors and through a CREED initiative. The evaluation team then cleaned and processed all data for analysis.^{11, 12} Besides the sales data made available through LightTracker, the model inputs were a combination of

¹⁰ LightTracker. "Consortium for Retail Energy Efficiency Data." creedlighttracker.com

¹¹ The information contained herein is based in part on data reported by IRI, Inc., through its Advantage service for, and as interpreted solely by, LightTracker, Inc. Any opinions expressed herein reflect the judgment of LightTracker Inc. and are subject to change. IRI disclaims liability of any kind arising from the use of this information.

¹² Data presented include LightTracker calculations based in part on data reported by Nielsen through its Strategic Planner and Homescan Services for the lighting category for the 52-week period ending approximately December 31, 2020, for the available state-level markets and Expanded All Outlets Combined (xAOC) and Total Market Channels. Copyright © 2020, Nielsen.

program data collected by the evaluation team and household and demographic data collected through various publicly available websites. These were the sources for the primary model input data:

- National bulb sales
- POS data (grocery, drug, dollar, discount, mass merchandiser, and selected club stores)
- NCP data (home improvement, hardware, online, and selected club stores)
- U.S. Census Bureau import data (CFL and LED imports)
- DSM Insights, an E Source database of utility program data
- ENERGY STAR® Lighting program data (utility lighting program budgets)
- ENERGY STAR shipment data (released by the U.S. Environmental Protection Agency)
- North American Electrical Manufacturers Association shipment data
- American Community Survey (ACS) data (household characteristics and demographic data)
- Retailer square footage per state (based on internet searches)
- General population surveys, lighting saturation studies, and other secondary data collection made publicly available through evaluation reports

Lighting Sales

The LightTracker POS dataset includes lighting sales data for grocery, drug, dollar, club, and mass market distribution channels. These data represent actual sales that were scanned at the cash register for participating retailers.

The NCP represents a panel of approximately 100,000 residential households that were provided a handheld scanner for their homes and instructed to scan every purchase they made that had a bar code. For Wisconsin, the NCP collected data from approximately 1,600 households in 2021. The use of a scanner avoids potential recall bias, which is prevalent in self-report methods that ask about lighting purchases. IRI's analysis of scanner sales patterns estimated that approximately 60% of the homes were in full compliance and scanned all purchases; NCP removed any households from the analysis that did not scan all products.

Although the dataset included detailed records of lighting data purchases, the evaluation team spent considerable time ensuring data integrity and inclusion of all the necessary bulb attributes. For example, not all records were populated with some of the more critical variables such as bulb type, style, and wattage or the data had clearly erroneous values (e.g., 60-watt LEDs). After thorough review and quality control of the dataset, the evaluation team reclassified, standardized, and populated missing records, created additional variables, and performed general enhancements to the data.

To populate missing records, validate existing records, and include additional bulb attributes, CREED created a Universal Product Code (UPC) database from these multiple sources:

- Product catalogs downloaded from manufacturer and retailer websites via web scraping
- Automated lookups of online UPC databases, such as www.upcitemdb.com
- Bulb attributes entered as part of shelf-stocking studies from research conducted in a number of program and non-program states, including Alabama, California, Florida, Illinois, Maryland, Nebraska, and Tennessee

CREED then merged the UPC database with the POS data, populating fields based on a hierarchy of data sources believed to be most reliable, typically prioritizing sources in the following order: manufacturer specifications, UPC lookups, and original POS-based database values. The CREED team also conducted manual website lookups on over 100 high-volume bulbs to verify final assignments.

Additionally, the CREED team investigated the bulb assignment and the quantity of bulbs per package by examining the average price per unit and identifying outliers in terms of per bulb prices. This process helped identify misclassification of certain bulb types (e.g., bulbs that were flagged as low-cost LEDs but were really LED nightlights and needed to be moved to the “other” lamp type bin), bulb counts that sometimes represented box shipments (e.g., a package identified as having 36 bulbs was really a six-pack of LEDs that was shipped with six packages per box), or high-cost LEDs that were really Wi-Fi-enabled smart LEDs. The CREED team also used lumens per watt as a check on bulb assignments (efficient bulbs should have higher lumens per watt values than inefficient bulbs). The sales model was restricted to screw-based bulbs, so any bulbs classified as type “other” were not included in the model.

CREED estimated missing lumen values and missing lamp styles. Regarding lumens, CREED leveraged ordinary least squares (OLS) regression models that predicted lumens based on the type of light and the wattage of the bulb. Regarding style (e.g., A-line, reflector, globe, candelabra), CREED used classification and regression trees, a method commonly applied to classification problems, to populate the style attribute for lamps that were missing data.

After accounting for the smaller states that lacked sufficient sample size from the panel data or had incomplete program data available, the final model contained 43 states. The lighting dataset included these key aspects:

- 2021 sales volume and pricing for CFLs, LEDs, halogens, and incandescent bulbs for all channels combined and broken out by the POS and non-POS channels
- Data reporting by state (with 43 states included in both POS and non-POS) and bulb type
- Inclusion of all bulb styles (A-lamps, reflectors, globes, and candelabras)

As detailed below, the dependent variable of the model was the percentage of LED sales, rather than total LED sales, to normalize for states with greater or lesser bulb sales (LED or standard) because of differences in number of households, number of sockets, existing saturation, and other factors that drive lighting sales.

Program Activity

To research upstream lighting program activity in the 43 states, the evaluation team used internal resources and conducted a literature review of publicly available reports found on the internet or provided by program administrators or their evaluators.¹³ The evaluation team contacted local utilities in areas where reports with relevant information were not available. Additionally, the evaluation team accessed DSM Insights, an E Source product that provides a detailed breakdown of program-level spending, including incentives, marketing, and delivery for over 100 program administrators around the country.¹⁴

The evaluation team collected these program data:

- Total number of claimed LED upstream program bulbs reported by each program (where possible, broken out by bulb style and with giveaway bulbs removed)
- Upstream LED incentives
- Total upstream program budget

The evaluation team used actual program expenditures and, where unavailable, used expenditures reported by ENERGY STAR as a proxy.^{15, 16} After accounting for the states with incomplete program data, the final model included 43 states (detailed below).

To determine upstream lighting offering activity in Wisconsin, the evaluation team used the SPECTRUM database and implementer’s tracking data to determine the number of program-supported bulbs sold in the state. Year-end Focus on Energy expense reports and implementer data provided the incentives and the overall program expenditures (Table G-2).

¹³ In particular, the evaluation team began by searching the ENERGY STAR website. “ENERGY STAR Summary of Lighting Programs.” Accessed February 2021. [2020 ENERGY STAR Summary of Lighting Programs](#). The team also referenced the DSIRE website. “Database of State Incentives for Renewables & Efficiency.” Accessed February 2021. [dsireusa.org](#)

¹⁴ E Source. “DSM Insights.” Accessed February 1, 2021. <https://www.esource.com/dsm-insights-and-measure-insights>

¹⁵ ENERGY STAR. “ENERGY STAR Summary of Lighting Programs: August 2019 Update.” 2019. Available online: <https://www.energystar.gov/productfinder/downloads/2019/2019%20ENERGY%20STAR%20Summary%20of%20Lighting%20Programs.pdf>

¹⁶ Since the ENERGY STAR report included only expenditure ranges, the evaluation team used the midpoints of the ranges to represent the expenditures.

Table G-2. 2020-2021 Focus on Energy Upstream Lighting Offering Statistics

Year	Offering Expenses	LED Incentives	LED Quantity	A-Lamp Quantity	Reflector Quantity	Globe & Candelabra Quantity	Fixtures Quantity
2020	\$10,788,830	\$7,920,793	5,387,507	4,441,312	764,961	181,234	N/A ^a
2021	\$7,211,266	\$5,383,325	4,975,935	3,890,365	780,487	293,473	11,610

^a Fixtures were separately counted for the first time in 2021.

Presence and Absence of Retailers (Channel Variables)

The evaluation team conducted secondary internet research to determine the number and total square footage of store locations in each state for five primary energy-efficient bulb retailers—The Home Depot, Lowe’s, Walmart, Costco, and Menards. The evaluation team used these data as explanatory variables in the model since these retailers sell a large quantity of energy-efficient bulbs and the percentage of efficient bulb sales could differ in states with more or fewer retail locations. The non-POS data (derived from the NCP) does include purchases made through online retailers.

State-Level Household and Demographic Characteristics

The evaluation team gathered state-level demographic data from the ACS, including annual state-level data for the population, total number of households, household tenure (own versus rent), home age, education, income, and average number of rooms in the home. As explained below, the evaluation team then combined these data with other possible explanatory variables, including political index, average cost of living, and average electric retail rates.

Analysis of the Combined Dataset (Descriptive Statistics)

The primary objective of this model was to determine the impacts of program spending on the market share of LEDs to derive state-level NTG estimates. A secondary, but no less important, objective was to relate these national lighting sales and program activity data to an assessment of some of the key factors driving LED market share specifically in Wisconsin. By accessing national lighting sales data and researching the largest known compilation of state program activity (e.g., incentives, overall expenditures, bulb volumes), the evaluation team could analyze and summarize lighting program activity in a way that has not been possible before.

Some of the key lighting program attributes the evaluation team developed were these:

- **Market share distribution.** LED market share distribution for the United States, Wisconsin vs. the U.S., as well as across each state and across retail channels.
- **Program intensity.** LED lighting market share relative to overall program expenditures per household.
- **Program incentives.** Average LED lighting program incentives per bulb.
- **ENERGY STAR market share distribution.** LED market share distribution in Wisconsin compared to states that do not run an upstream lighting program.

Market Trends

Figure G-1 shows the national market share of the four bulb types (incandescent, halogen, CFL, and LED) across the past six years. LEDs continue to gain substantial market share, rising from 19% in 2015 to 76% in 2021. From 2015 to 2017, LEDs largely displaced sales of CFLs only. In 2018, LEDs began to displace inefficient bulbs. Even so, inefficient lighting (incandescent bulbs and halogens) still represented almost a quarter of the lighting market in 2021.

Figure G-1. Year-Over-Year Total U.S. Market Share by Lamp Type

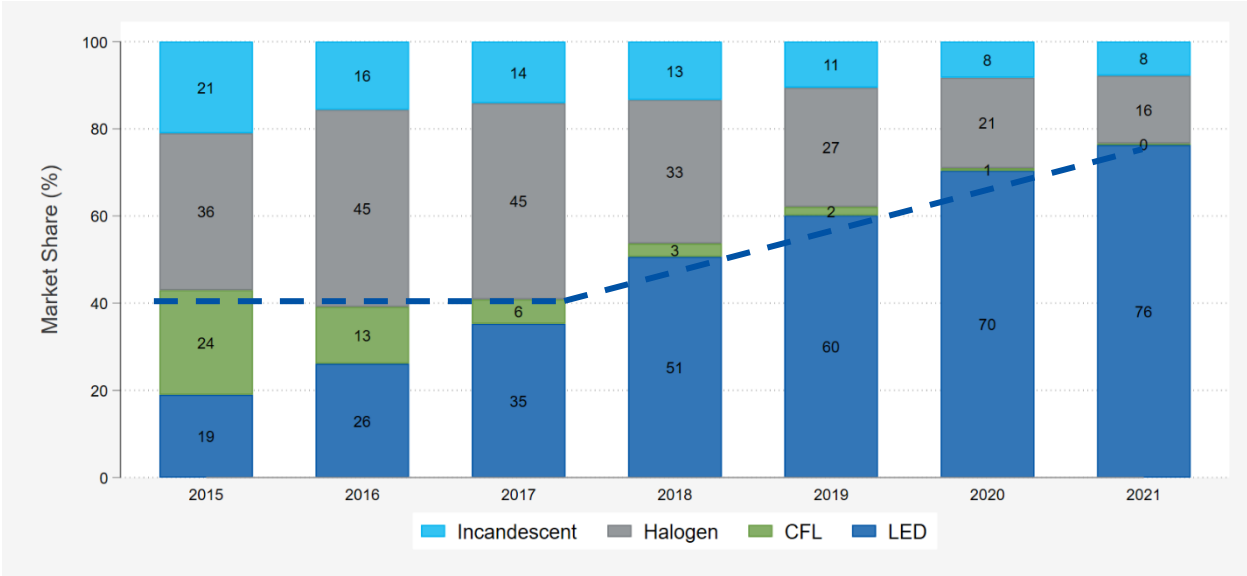


Figure G-2 compares the data in Figure G-1 to Wisconsin market shares. In terms of LED market share, Wisconsin distanced itself from the national market share in 2016. Since then, Wisconsin LED market share has consistently been greater than national market share by upwards of ten percentage points.

Figure G-2. Wisconsin and Total U.S. Year-Over-Year LED Market Share

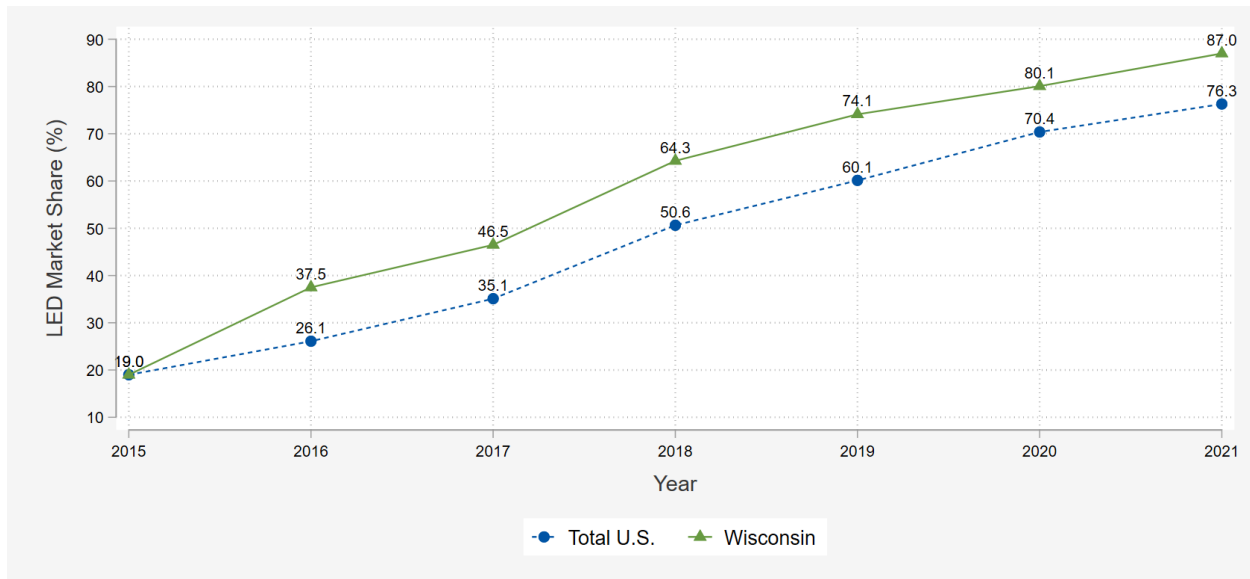
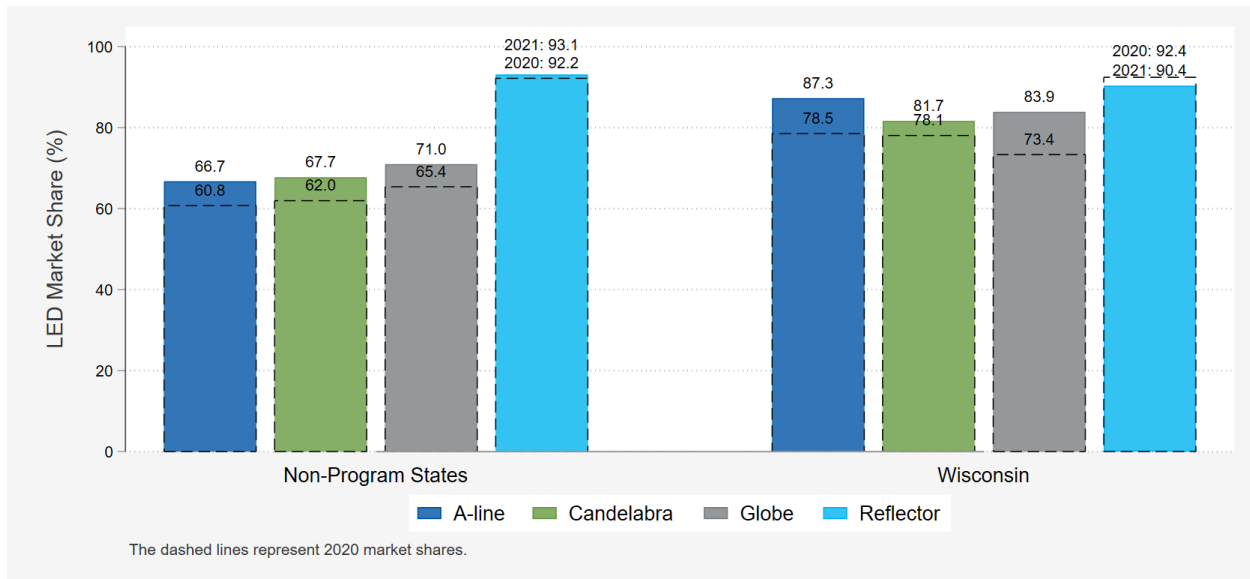


Figure G-3 shows the LED market share by lamp style. Breakouts are shown for non-program states and Wisconsin across 2020 and 2021.¹⁷ The market shares differ by style, with LEDs representing a majority of all bulb styles even in states without programs. LED market shares in Wisconsin tended to exceed LED market shares in non-program states by several percentage points. For A-lines in particular, the LED market share in Wisconsin was around 20 percentage points higher than the share in non-program states in both years. Reflectors were on the other end of the spectrum, where the 2021 LED market share in Wisconsin slightly trailed the market share in states without upstream lighting programs.

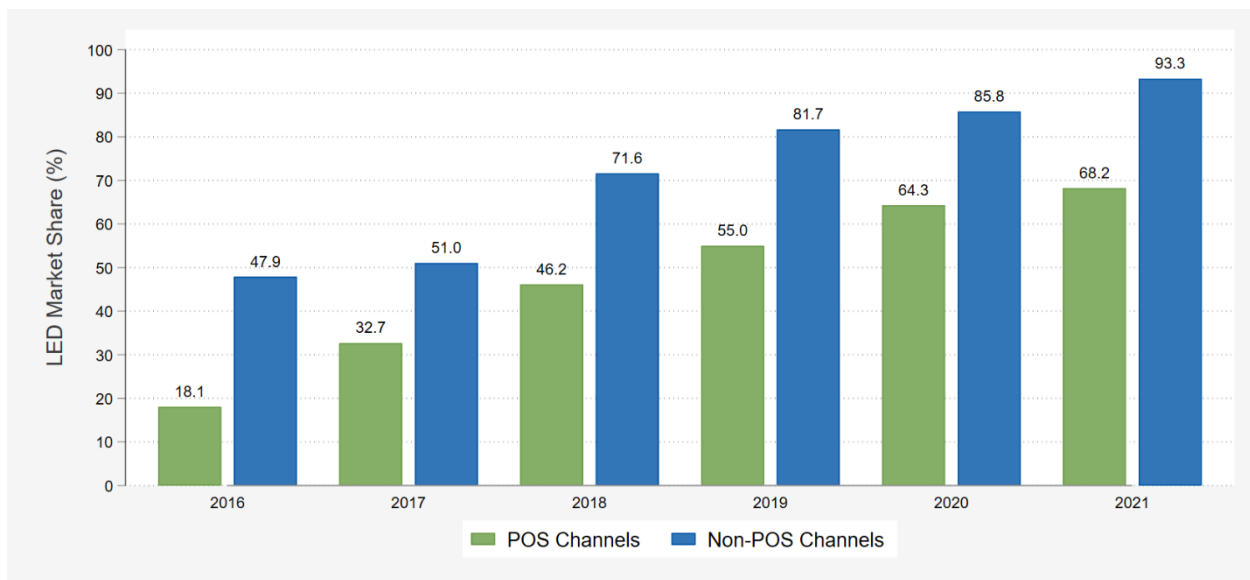
¹⁷ The non-program states in 2021 were Alabama, Kansas, Kentucky, Mississippi, Nebraska, Tennessee, and Wyoming. The team did not include states that adopted EISA standards or states that offered programs prior to 2021 but not in 2021 in the non-program bin.

Figure G-3. LED Market Share by Lamp Style (2020-2021)



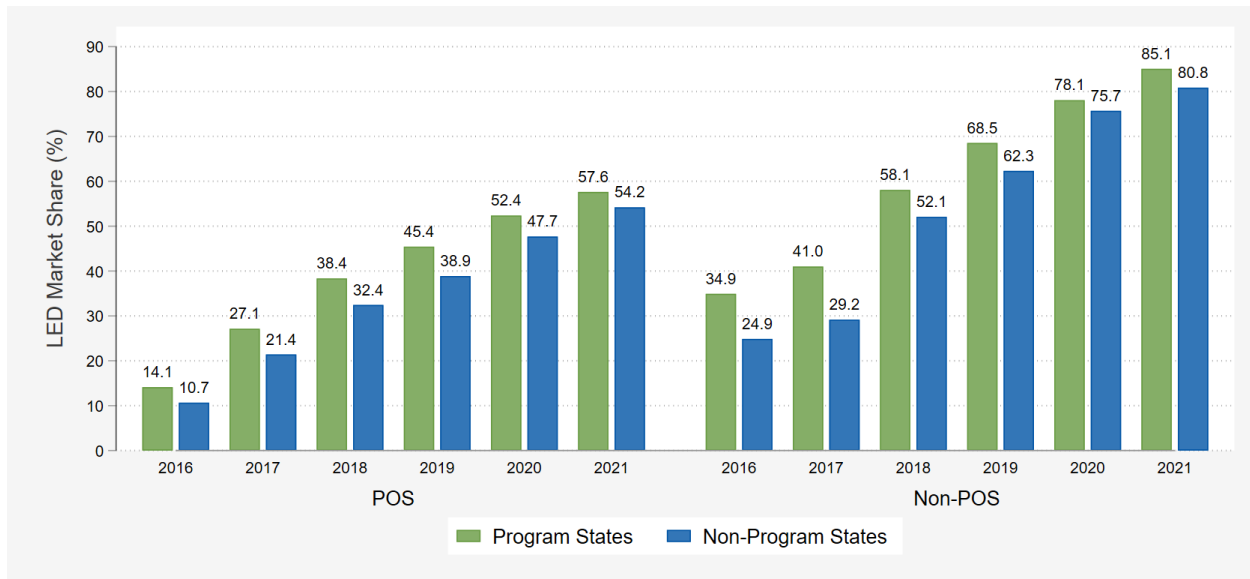
Analysis of the sales data model revealed that LEDs had greater market share in Wisconsin’s non-POS retail channels than the POS retail channels, as shown in Figure G-4.¹⁸ In 2021, approximately 93% of the lighting purchases made in Wisconsin’s non-POS channel were LEDs, compared to approximately 68% in the POS channel. LED market share has increased in both retail channels since 2016. Figure G-5 shows a similar distribution between program states and non-program states.

Figure G-4. Wisconsin LED Market Share by Retail Channel



¹⁸ In total, approximately 75% of bulbs were purchased in the non-POS channels.

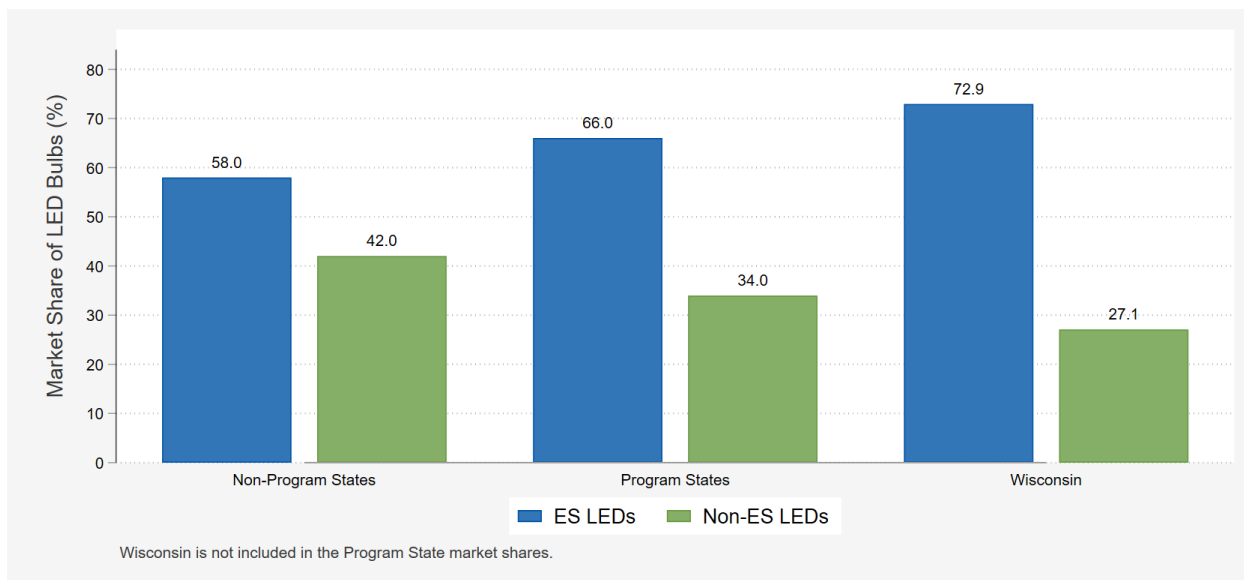
Figure G-5. LED Market Share by Retail Channel and Program Status



The evaluation team looked at ENERGY STAR LED distribution when there was sufficient resolution.¹⁹ In Figure G-6, the POS retail channel shows that 73% of LED purchases in Wisconsin were ENERGY STAR LEDs, compared to 66% of LED purchases in other program states (excluding Wisconsin).

¹⁹ Because the ENERGY STAR website does not include the UPCs of all qualifying lamps, the evaluation team had to identify ENERGY STAR-qualified lamps using make, model, and rated lifetime. In total, the evaluation team was successful at attributing 98% of LED sales with an ENERGY STAR attribute (that is, an LED was designated ENERGY STAR or was not). The remaining 2% of LEDs were excluded. This analysis was conducted using only the POS data, as the panel data did not contain sufficient sample size to stratify by ENERGY STAR designation.

Figure G-6. ENERGY STAR LED Wisconsin Share (2021 POS Channels)

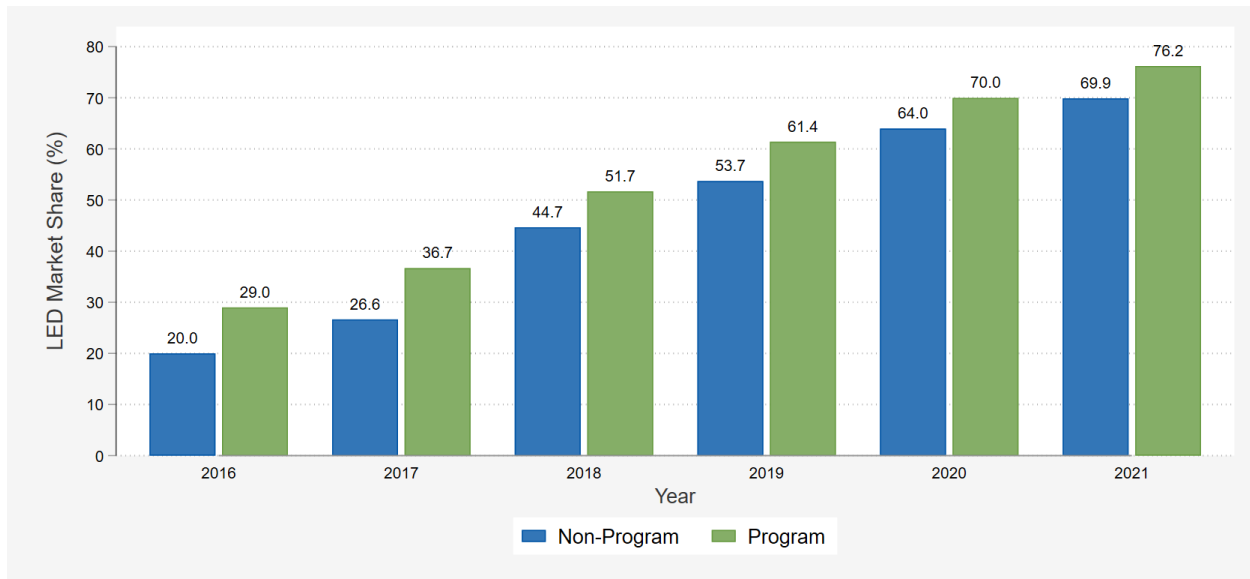


Program Activity

Figure G-7 shows the state-level LED share as a function of program activity (program state or non-program state). It is important to note that the number of states in each bin varies by year. In 2021, there were seven states in the non-program bin and 34 states in the program bin.²⁰ There are two key takeaways from the figure: first, LED share was higher in program states, although the gap decreased from about ten percentage points in 2016 and 2017 to about four percentage points in 2021. Second, LED share in non-program states typically lagged LED share in program states by about one year (e.g., in 2018, the average LED market share was 52% in program states, and in 2019 the no program states had an LED market share of about 54%).

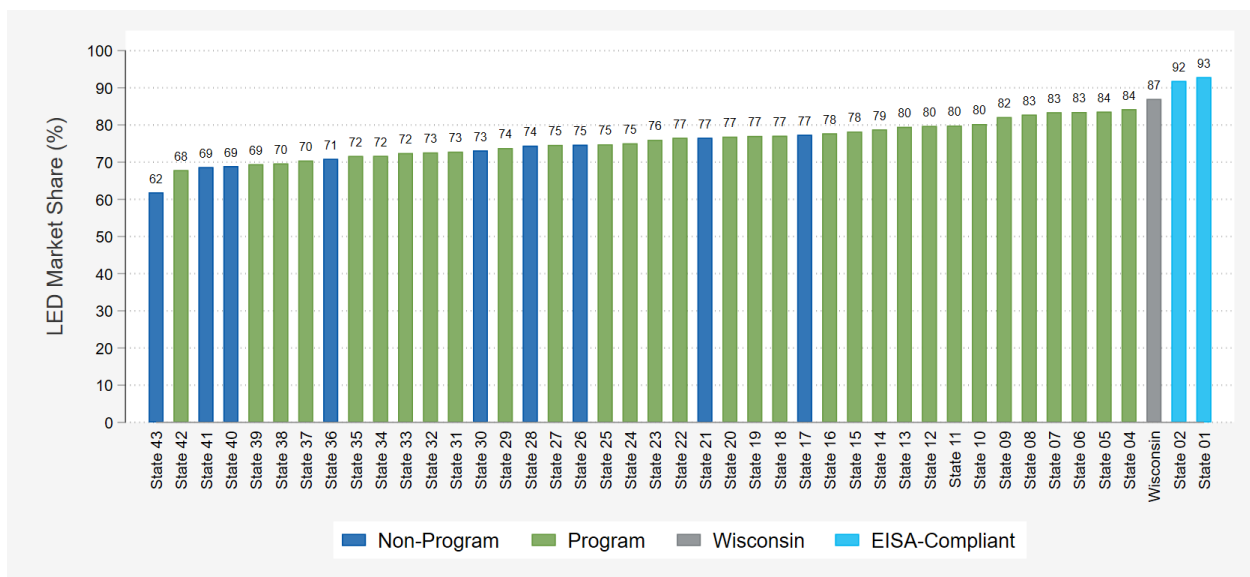
²⁰ As noted elsewhere, the non-program states in 2021 were Alabama, Kansas, Kentucky, Mississippi, Nebraska, Tennessee, and Wyoming. A couple of additional states partially implemented EISA but are not shown in the figure.

Figure G-7. Relationship Between Program Activity and LED Sales



Similarly, Figure G-8 shows how LED sales in Wisconsin compared to the 43 modeled states. States highlighted in green represent states with programs. Darker blue bars represent states that did not offer a lighting program, and lighter blue bars represent states that have fully adopted EISA standards. There are a handful of program states with low LED market shares, but states without programs generally have lower LED market shares. Most of the non-program states have LED market share below 76% (the national LED market share).

Figure G-8. LED Sales Distribution Across States (2021)



Program Intensity

Figure G-9 shows the distribution of programs lamps per household for states in which the evaluation team had sufficient data. Approximately 1.8 LED lamps per household were distributed through Wisconsin’s upstream lighting offering. Across states, the mean and median were both approximately 1.2 lamps per household.

Figure G-9. Average Number of Program Lamps per Household (2021)

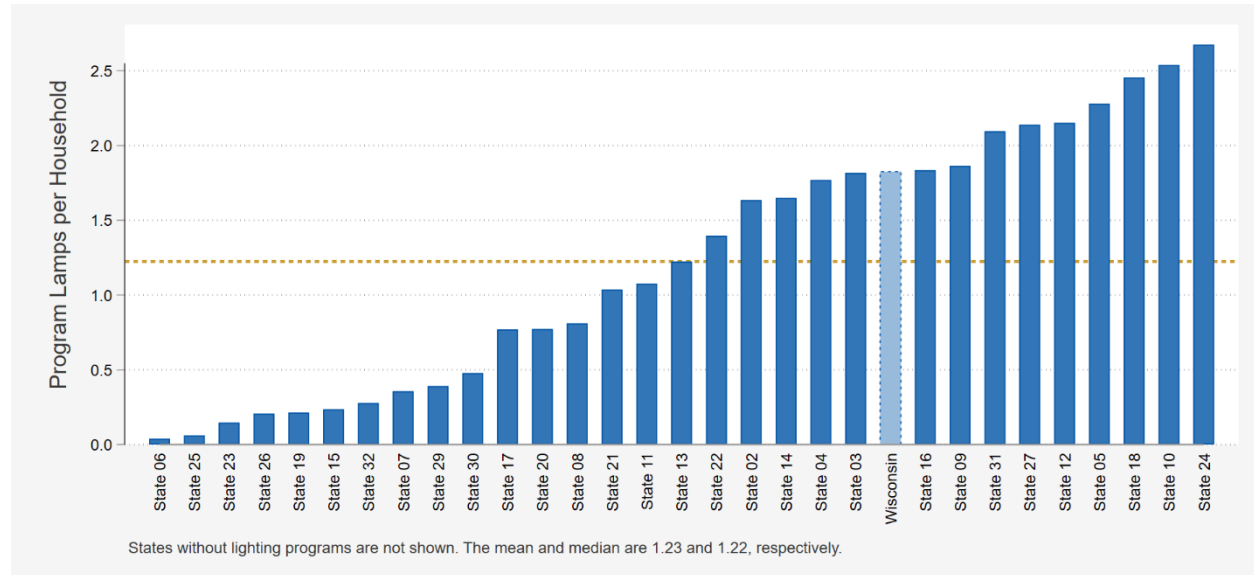
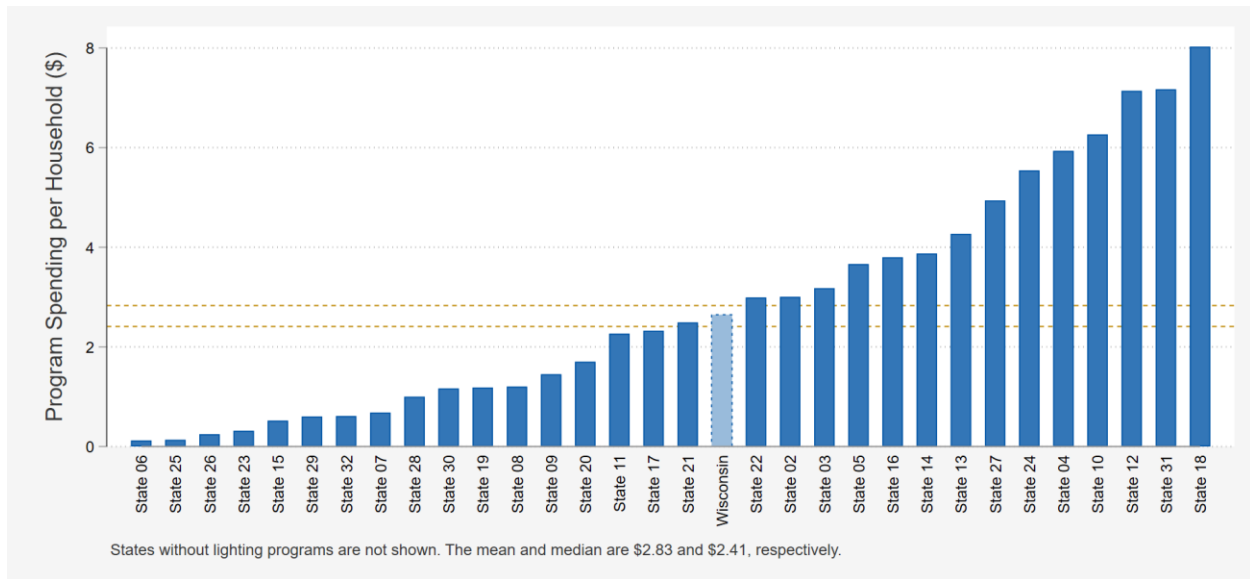


Figure G-10 shows the distribution of program spending per household for states in which the team had sufficient data. In most states, upstream lighting offerings spend fewer than \$5 per household. Across states, the average and median values were \$2.83 and \$2.41 per household. Wisconsin’s upstream lighting offering falls slightly below the mean \$2.65 per household.

Figure G-10. Average Program Spending per Household (2021)



The evaluation team compared the average incentive per LED across states in which LED incentive information was collected (Figure G-11). A calculation of incentive dollars divided by bulb units yielded average incentive per bulb. LED incentives ranged from approximately \$0.75 to \$2.75 per LED bulb on average, with most states offering between \$1 and \$2 per LED. The mean and median LED incentive were \$1.70 and \$1.69, respectively. At \$1.08 per LED, Wisconsin falls on the lower end of the distribution.

Figure G-11. Average Upstream Lighting Incentive Per LED (2021)

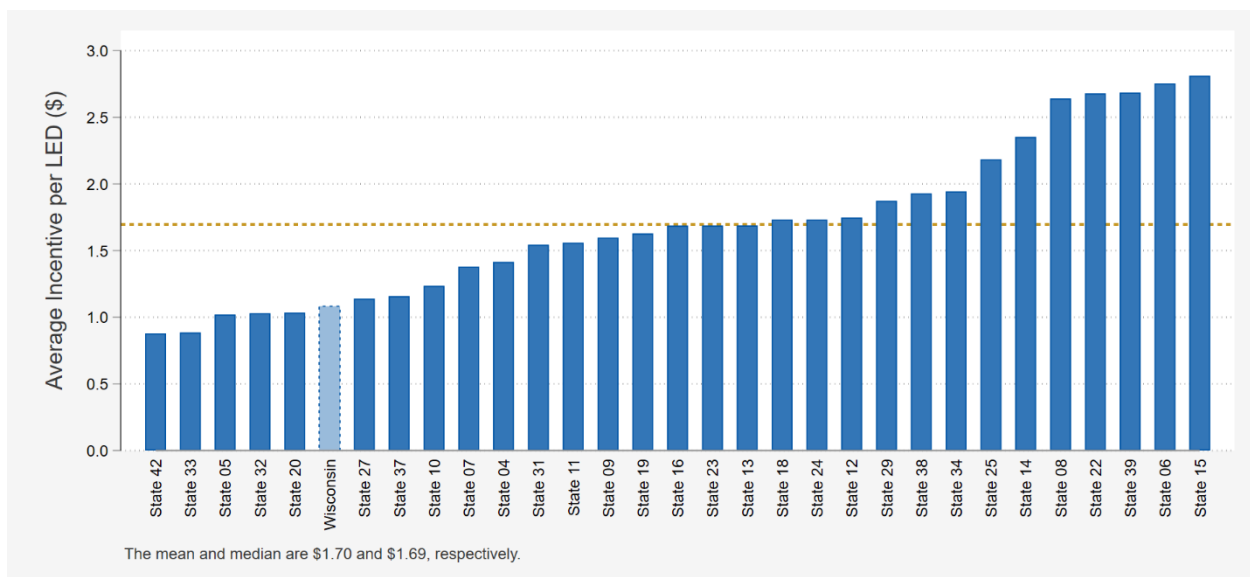
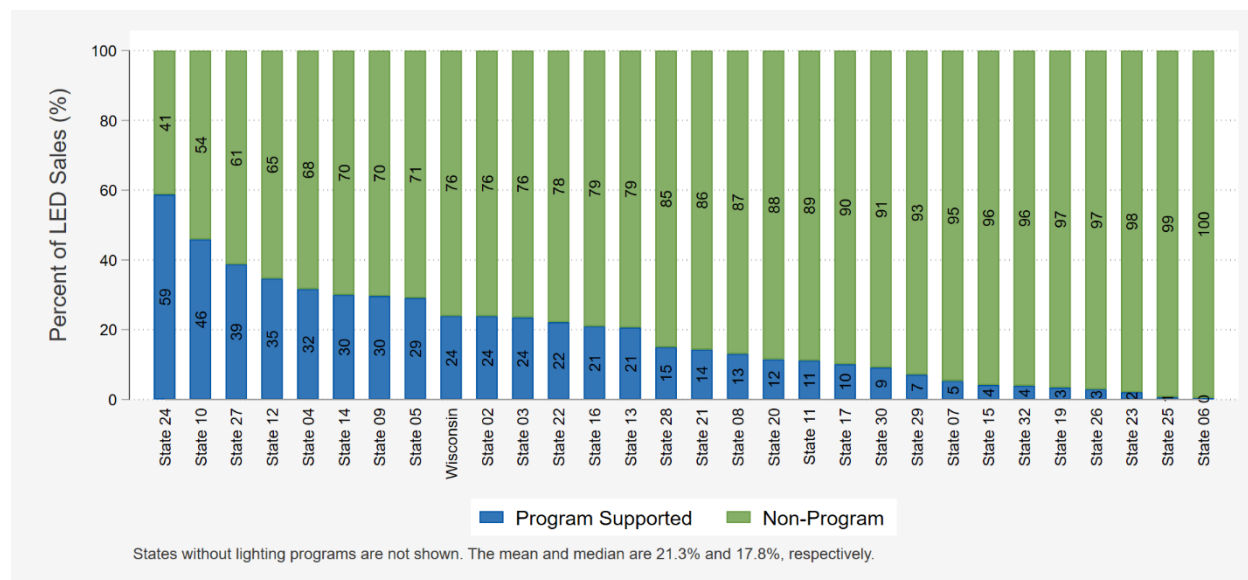


Figure G-12 shows the percentage of LED sales, by state, that were attributed to an upstream lighting program (where this percentage was calculated by dividing the number of incented LED bulbs by the

total LED bulbs sold in the state). Across all states, the average percentage was 21.3% and the median was 17.8%. Wisconsin falls slightly above average at 24.0%.

Figure G-12. Percentage of LED Sales Supported by Upstream Lighting Program (2021)



It is clear from the data used for the national sales model that program spending was at least partially responsible for an increased market share of LED sales. Although these figures help illustrate program activity in relation to LED sales, the regression analysis provided information about what other factors could be influencing the marketplace and a better understanding of the programmatic impacts. The next section presents the key findings from the national sales model.

Modeling Methods

As previously stated, the primary objective of the model was to quantify the impact of state-level retail lighting program activity on the sales of LEDs, while controlling for demographic, household characteristics, and retail channel variables that could affect consumers’ uptake of efficient lighting.

The general form of the model is specified below, followed by a more detailed discussion of the data sources for each variable. The evaluation team considered the comprehensive set of variables listed below; the final model, presented in Table G-3, lists the variables ultimately selected for inclusion based on their statistical significance and ability to improve the model specification (see the *Multivariate Regression Model* section under *Key Findings* for more information).

$$LED\ Market\ Share_i = \beta_0 + \beta_1 * Program\ Spending\ Variable_i + \beta_2 * Program\ Age\ Variable_i + \beta_3 * \sum_1^3 Channel\ Variables_i + \beta_4 * \sum_1^7 Demographic\ Variables_i + \epsilon_i$$

Where:

<i>LED Market Share_i</i>	=	Proportion of total LED sales in state 'i'. Equal to [LED sales/total bulb sales]
β_0	=	The model intercept
β_1	=	The primary coefficient of interest. This represents the marginal effect of program intensity
β_2	=	Another coefficient of interest. This represents the marginal effect of program age
<i>Program Spending Variable_i</i>	=	A numeric variable that summarizes state-level retail lighting program dollars per household in state 'i'. Two different program spending variables were tested; Table G-3 lists additional detail.
<i>Program Age Variable_i</i>	=	The number of years state 'i' has been running an upstream lighting program. Two different program age variables were tested; Table G-3 lists additional detail.
β_3 and β_4	=	Array of regression coefficients for the channel and demographic variables
<i>Channel Variables</i>	=	Numeric variables summarizing state-level retailer characteristics. Table G-3 lists additional detail
<i>Demographic Variables</i>	=	Numeric variables that summarize state-level population, housing, and economic attributes. Table G-3 lists additional detail.
ϵ_i	=	Error term

Table G-3. Program Intensity, Channel, and Demographic Variable Descriptions

Type of Variable	Description
Program Intensity Variables	
Program Spending per Household _i	Total upstream program budget in state 'i' divided by the number of households in state 'i'.
SQRT (Program Spending per Household) _i	Square root of the program spending per household.
Program Age _i	Number of years program administrators in state 'i' have operated upstream lighting programs (CFL or LED).
SQRT (Program Age) _i	Square root of the program age.
Channel Variables	
NonPOS sq. ft. per HH _i	Average non-POS retail square footage per household in state 'i.' Equal to non-POS square footage divided by the number of households in state 'i'.
POS sq. ft. per HH _i	Average POS retail square footage per household in state 'i.' Equal to POS square footage divided by the number of households in state 'i'.
Percent sq. ft. NonPOS _i	Percentage of total retail square footage belonging to non-POS retailers in state 'i.' Equal to non-POS square footage divided by (POS sq. ft. + non-POS sq. ft.).

Type of Variable	Description
Demographic Variables	
Political Index _i	A state-level partisan voter index developed by Gallup ^a using presidential election voting results as a state-level partisan proxy. A higher than 1.0 value represents greater democratic influence and a value less than 1.0 indicates greater republican influence. ¹
Average Electricity Cost _i	State-level average residential retail rate of electricity sourced directly from the Energy Information Agency. ^b
Cost of Living _i	State-level cost of living indices developed by the Missouri Economic Research and Information Center. ^c
Percentage of Renters Paying Utilities _i	All state-level demographic and household variables were derived from the most current U.S. Census ACS. ^d
Median Income _i	
Percentage Owner Occupied _i	
Percentage of Population with College Degree _i	

^a Gallup. "State of the States." Accessed February 2022: news.gallup.com/poll/125066/state-states.aspx

^b US Electricity Information Association. "Electricity." Accessed February 2022: <https://www.eia.gov/electricity/data/state/>

^c Missouri Economic Research and Information Center. "Cost of Living Data Series 2020 Annual Average." Accessed February 2022: <https://meric.mo.gov/data/cost-living-data-series>

^d American Community Survey. Accessed February 2022: <https://data.census.gov/cedsci/all?q=S25&d=ACS%201-Year%20Estimates%20Subject%20Tables&tid=ACST1Y2019.S2504>

Correlation of the Independent (Explanatory) Variables

Table G-4 shows the correlation between the dependent variable (LED market share) and 14 potential explanatory variables—the four program intensity variables (spending per household, square root of spending per household, program age, and square root of program age) and the 10 channel and demographic/household variables. Twelve of the variables are positively correlated with LED market share (green bars) and two are negatively correlated (red). The absolute value of the correlation coefficient indicates the strength of the linear correlation. States that have fully adopted EISA standards were not included in the calculation of these correlations.

Table G-4. Independent Variable Correlation Table

Explanatory Variable	Correlation with LED Market Share	
Spending per Household	0.332	
Square Root of Spending per Household	0.415	
Program Age	0.427	
Square Root of Program Age	0.456	
Non-POS Square Footage per Household	0.070	
POS Square Footage per Household		-0.275
Percentage of Square Footage in Non-POS	0.293	
Political Index	0.307	
Median Income	0.364	
Average Electricity Cost	0.022	
Cost of Living	0.215	
Percentage of Renters Paying Utilities		-0.311
Percentage Owner Occupied	0.011	
Percentage of Population with College Degree	0.441	

As expected, program age and program spending show relatively strong correlations with LED market share (i.e., higher LED market shares typically occurring in states with more program spending and longer-running programs). Notably, the square root transformations of program spending and program age show greater correlation with LED market share than the non-transformed versions. The square root transformations were tested because they reflect diminishing returns in terms of market share as program spending and program age increase. Figure G-13 visualizes the correlation between these key variables and LED market share. Figure G-14 visualizes the difference between using program spending and the square root of program spending.

It is also notable that the percentage of the population with a college degree shows a relatively strong positive correlation with LED market share.

Figure G-13. LED Market Share against Program Intensity

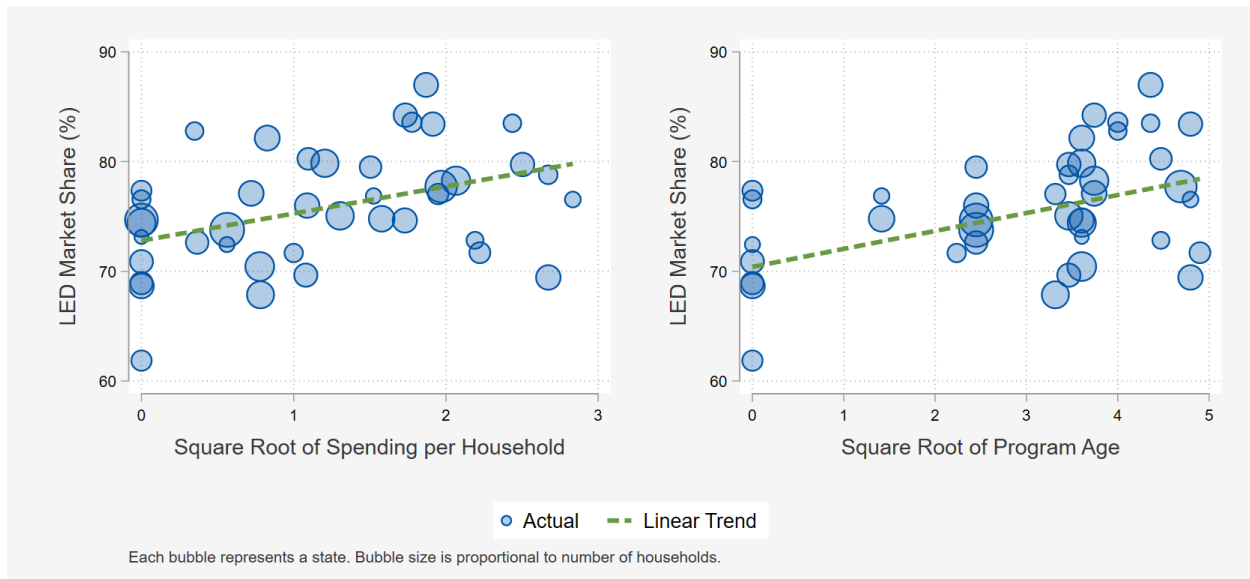
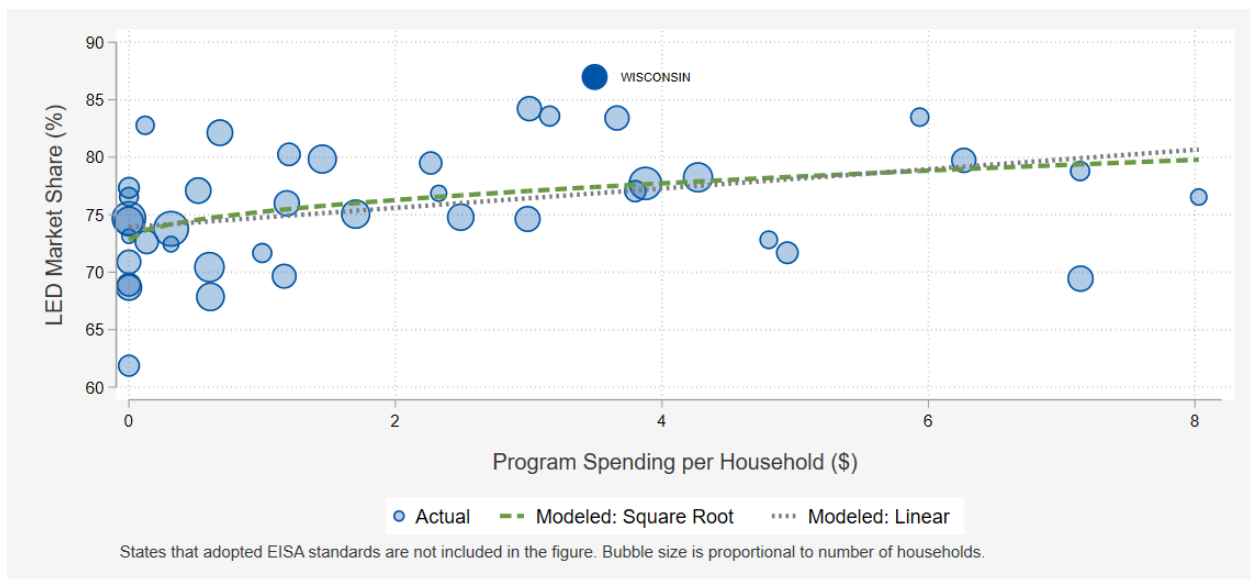


Figure G-14. Linear vs. Non-Linear Modeling



In addition to being correlated with LED market share, many of the explanatory variables were correlated with each other. Table G-5 shows a pairwise correlation matrix among the potential independent variables. Including multiple independent variables that are correlated with one another in a regression model causes the model to have difficulty precisely estimating the effect of the correlated terms. This issue was further compounded in this analysis by the relatively low number of observations in the dataset.

Table G-5. Covariance Table of Potential Independent Variables

	LED Market Share	Spending per Household	Square Root of Spending per Household	Program Age	Square Root of Program Age	Non-POS Square Footage per Household	POS Square Footage per Household	Percentage of Square Footage in Non-POS	Political Index	Median Income	Average Electricity Cost	Cost of Living	Percentage of Renters Paying Utilities	Percentage Owner Occupied
Spending per Household	0.33													
Square Root of Spending per Household	0.41	0.95												
Program Age	0.43	0.65	0.69											
Square Root of Program Age	0.46	0.57	0.65	0.95										
Non-POS Square Footage per Household	0.07	-0.15	-0.10	-0.19	-0.11									
POS Square Footage per Household	-0.27	-0.41	-0.39	-0.68	-0.63	0.23								
Percentage of Square Footage in Non-POS	0.29	0.47	0.46	0.69	0.63	-0.06	-0.96							
Political Index	0.31	0.63	0.62	0.65	0.62	-0.17	-0.83	0.83						
Median Income	0.36	0.62	0.61	0.54	0.49	0.06	-0.66	0.73	0.80					
Average Electricity Cost	0.02	0.65	0.56	0.66	0.51	-0.33	-0.67	0.68	0.61	0.50				
Cost of Living	0.22	0.53	0.49	0.66	0.55	-0.50	-0.78	0.77	0.71	0.63	0.72			
Percentage of Renters Paying Utilities	-0.31	-0.63	-0.58	-0.63	-0.49	0.38	0.62	-0.60	-0.52	-0.58	-0.65	-0.71		
Percentage Owner Occupied	0.01	-0.19	-0.19	-0.31	-0.25	0.56	0.39	-0.35	-0.48	-0.34	-0.36	-0.68	0.32	
Percentage of Population with College Degree	0.44	0.49	0.51	0.51	0.48	0.15	-0.52	0.56	0.69	0.87	0.38	0.46	-0.42	-0.27

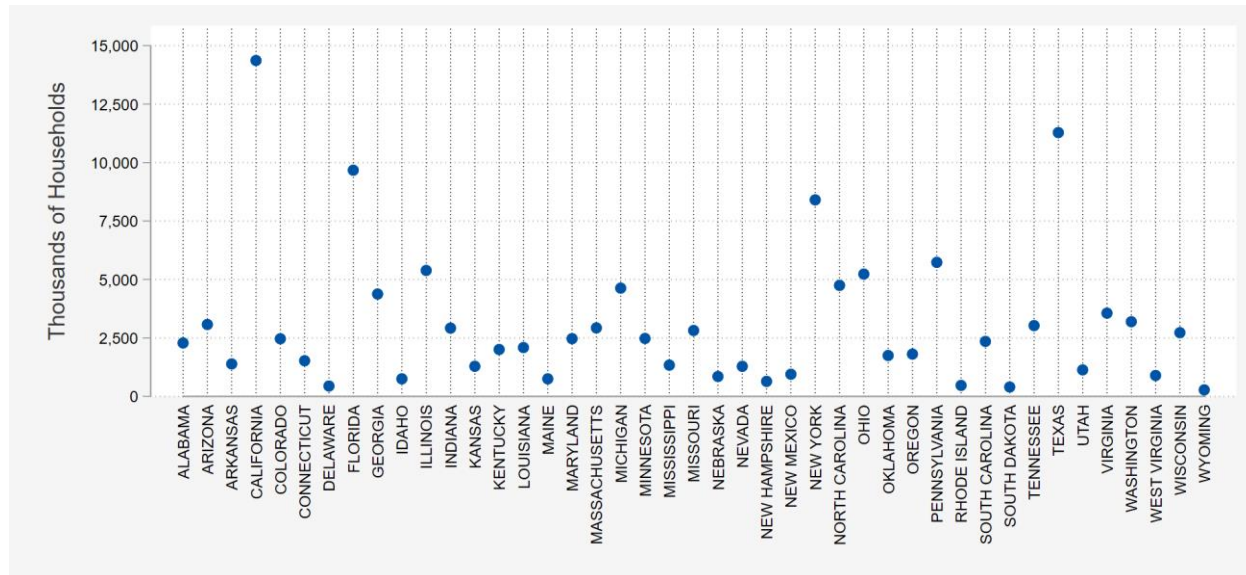
Model Weighting

Another key consideration in developing the model was how to weight each of the states. Each state is a single observation in the model, but the data for that state comprise summarized observations from sales and panel data. Weighting each state equally would not have accounted for larger states having larger sample sizes in the panel data and bigger impacts on the lighting market as a whole. To capture these differences, the evaluation team considered using either the number of households or total bulb sales as the weight. The evaluation team determined that using total bulb sales as analytic weights in the model was inappropriate because sales are correlated with the dependent variable. Specifically, states with high LED market share tend to have lower total lamp sales because efficient lamps have longer measure lives than inefficient lamps so the sockets turn over less frequently.

In the NCP data, the sample size was generally proportional to number of households, and large states represented a larger share of the overall U.S. lighting market than smaller states. Given the difference in panel sizes, the average lighting share in large states was based on more measurements than small states, with a commensurate increase in aggregate measurement precision. Therefore, the evaluation team used number of households per state as the weight.

Figure G-15 shows the distribution of households for each of the 43 states in the model.

Figure G-15. Number of Households by State



Model Functional Form

Another critical decision in the modeling process is the selection of the functional form of the model. LED market share is constrained by 0 and 1. In other words, it cannot be less than 0% and it cannot be greater than 100%. The evaluation team looked at functional forms that impose these limits to produce the top half of an S-curve. Since the LED market share values only ranged from 62% to 93%, and much of that variation is explained by program intensity and program age, the evaluation team elected to

estimate the model using OLS regression. Using OLS did not result in any unrealistic predictions (e.g., predicted market share less than 0% or greater than 100%).

NTG Estimates

Using the results of the regression models, efficient bulb sales data, and the program tracking databases, the evaluation team estimated NTG ratios for LEDs in 2021. The evaluation team derived NTG ratios by first using the model to predict the share of efficient bulbs with and without a program (determining the counterfactual of no program activity by setting the program spending variable to zero). This change in share represents the program lift, or net increase in the share of efficient bulbs resulting from program activity.

To then calculate NTG, the evaluation team multiplied the change in share by the total number of bulbs—for all bulb types—sold in 2021, as determined by the sales data analysis described above. This value represents the net impact of the program (i.e., the total lift in the number of LEDs sold), which the evaluation team then divided by the total number of program bulbs sold (the gross number of bulbs) to determine NTG:

$$NTGR = \frac{(\# \text{ LED bulbs sold with program} - \# \text{ LED bulbs sold with no program})}{\# \text{ of program incented LED bulbs sold}}$$

Key Findings

The following section presents the findings from applying the multivariate regression model.

Multivariate Regression Model

The regression coefficients for the program intensity variables, and subsequent estimates of the NTG ratio, proved relatively stable across a number of model specifications. Table G-6 displays the relevant statistics for the 2021 model. As in prior years, the 2021 model includes independent variables for program intensity, channel effects, and demographic/household effect. An EISA indicator variable was also included in 2021. This variable measures the effect of EISA adoption on LED market share. The adjusted R² value for this model is 67.8%.²¹

²¹ In the context of this research, R² represents the percentage of the variation in LED market share that can be explained by the model. Higher values are better, as they indicate the model does a better job of predicting LED market share.

Table G-6. Model Summary Statistics (n = 43 States)

Independent Variables	Model Coefficient	P-Value of Coefficient
Intercept	0.6083	0.000
Program Spending per Household (square root)	0.0123	0.256
Program Age (square root)	0.0126	0.071
Non-POS Square Feet per Household	0.0066	0.668
% of Homes that are Owner-Occupied	0.0011	0.582
EISA Indicator Variable	0.1732	0.000
Model Adjusted R-squared	67.8%	

There are a few potential limitations to the model that are worth noting. It is possible that the model omitted variables that might better explain LED market share. In addition, the use of comparison states in the baseline will not reflect any potential influence that upstream lighting programs being offered throughout the country have had on non-program states. In other words, if the Focus on Energy upstream lighting offering, combined with the millions of dollars spent on lighting in other program states, has impacted the retailer sales of lamps in non-program and moderate program states, that impact would increase the baseline/comparison area sales and mean that the program spending coefficient was being underestimated, thus resulting in a conservative NTG.

The positive and significant coefficient for program age indicates that prior program activity does positively influence efficient market share in the current year. This may reflect a number of factors, including momentum in terms of customer awareness, education, and preference for efficient lighting, as well as retailer knowledge and promotion of efficient lighting. Program age might also be thought of as an indicator for market effects, meaning the portion of efficient lighting sales from potentially permanent changes in the market are a result of ongoing program activity.

One final note is that the model underpredicts LED market share for Wisconsin by about 8.9 percentage points (87.0% actual and 77.8% predicted). Figure G-16 shows actual LED market share against predicted LED market share, and Figure G-17 shows the residual for each state (where residuals were calculated as actual market share minus predicted market share). As shown in the figures, the underprediction of 9.2 percentage points for Wisconsin represents the largest underprediction made by the model.

Figure G-16. Actual LED Market Share against Predicted LED Market Share

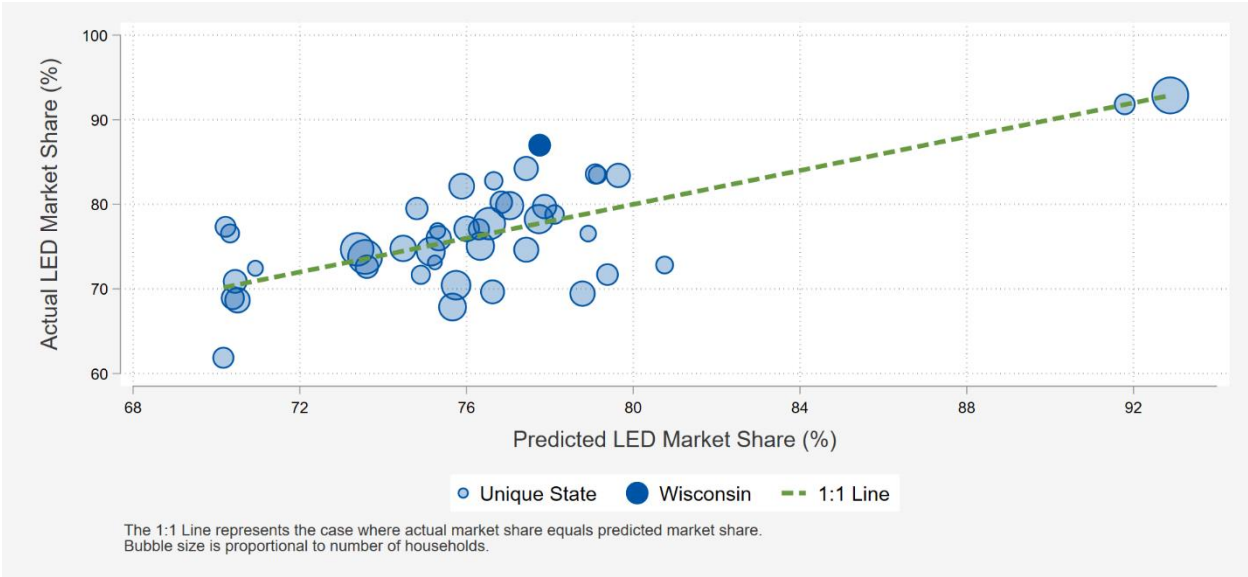
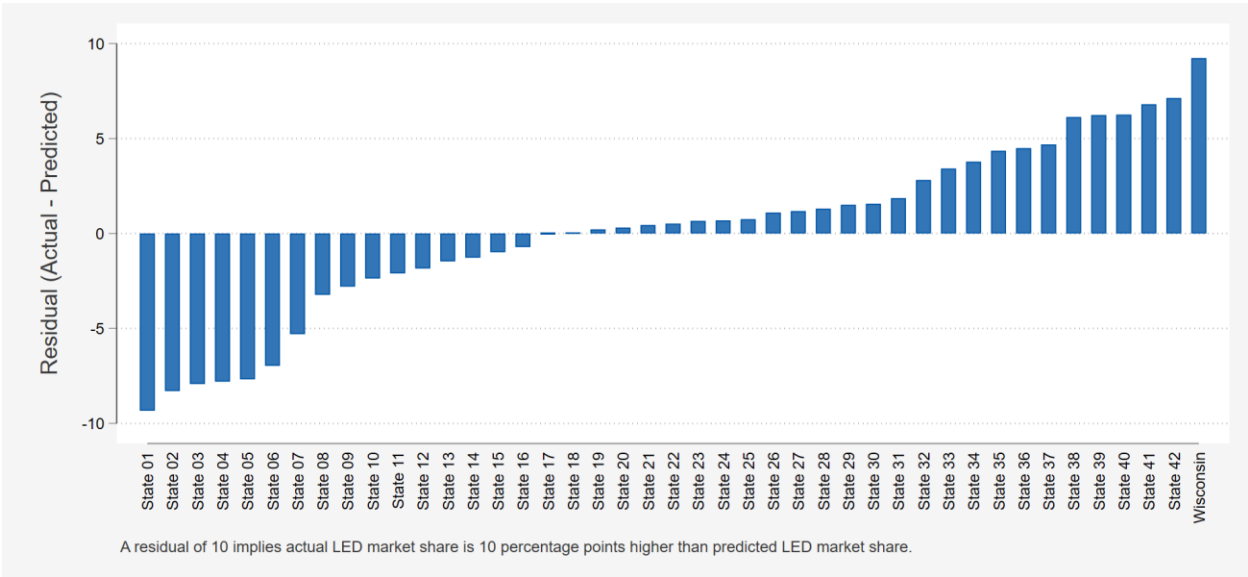


Figure G-17. Model Residuals



Though differences between predicted and actual may reflect omitted variables in the model, the higher-than-predicted market share for Wisconsin may also reflect improved program efficacy compared to other upstream lighting offerings in the U.S. (i.e., Wisconsin achieved a higher LED share per dollar spent by the upstream lighting offering). As discussed below, the evaluation team corrected the model underprediction by adjusting the NTG calculation.

NTG Estimates

The evaluation team determined NTG by first calibrating the model to the actual market share. Because the model underpredicts actual LED market share for Wisconsin (see Figure G-16 or Figure G-17), the

evaluation team adjusted the counterfactual under the assumption that it may be underpredicted as well. The adjusted counterfactual is calculated as follows:

$$\text{Adjusted Counterfactual} = \text{Unadjusted Counterfactual} * \frac{\text{Actual LED Market Share}}{\text{Predicted LED Market Share}}$$

Table G-7 shows this adjustment, where the ratio of the actual LED market (87.0%, Row H) to the predicted LED market share (77.8%, Row G) is 1.119 (Row I).²²

Next, the evaluation team calculated the counterfactual scenario in which the program spending per household (or the square root of program spending per household) is set to zero. Regarding program age, there are two options when developing the counterfactual:

- Programs have never existed (program age is set to 0).
- Programs did not exist in the year 2021 (subtract one year from the program age).

Table G-7, which shows the NTG calculations, includes separate NTG ratios for each of the two options identified above. In the Current and Past Influence scenario (i.e., the offering never existed scenario), the adjusted counterfactual (i.e., using the model calibration in Row I) LED market share is 78.6% (Row J), implying that LED share would be slightly more than three-fourths of all bulbs sold (or 18,772,525 bulbs, Row K) if the Focus on Energy upstream lighting offering had never existed. With the offering, however, LED share is based on the actual value of 87.0% (Row H), with a total of 20,769,836 LEDs sold (both program and non-program LEDs, Row L). The lift resulting from the offering is the difference of these two figures, or 1,997,311 LEDs (Row M). Since the offering claimed 4,975,935 LEDs in 2021, the NTG is 40.1% (the net lift in LED sales divided by the gross number of bulbs claimed). Using a similar approach, but examining the influence of the current program under the assumption that influences up to one year prior would have continued if the current program was terminated, the net lift in LED sales is only 574,252, with a NTG ratio of 11.5%.²³

Table G-7. Wisconsin NTG Calculations

Calculation Term	Current and Past Influence	Current Offering Spending and Age Influence
Total (All technologies) Wisconsin Bulbs 2021 (A)	23,876,096	23,876,096
Offering \$ per Household Actual (B)	\$2.65	\$2.65
Offering \$ per Household Counterfactual (C)	\$0.00	\$0.00
Offering Age Actual (D)	19	19
Offering Age Counterfactual (E)	0	18
LED Market Share Counterfactual (F)	70.3%	75.6%

²² Prior to the CY 2020 model, the modeled vs. actual with offering scenarios were closer and did not include this adjustment.

²³ Not including the model calibration adjustment provides Current and Past Influence and Current Offering Spending and Age Influence NTG ratios of 35.9% and 10.3%, respectively.

Calculation Term	Current and Past Influence	Current Offering Spending and Age Influence
LED Market Share Modeled (G)	77.8%	77.8%
LED Market Share Actual (H)	87.0%	87.0%
Ratio Actual: Modeled (I = H/G)	1.119	1.119
Adjusted LED Market Share Counterfactual (J)	78.6%	84.6%
LED Qty Counterfactual (K = A*J)	18,772,525	20,195,584
LED Qty Actual (L)	20,769,836	20,769,836
Net LEDs Modeled (M = L-K)	1,997,311	574,252
Claimed Bulbs 2021 (N)	4,975,935	4,975,935
NTG Modeled (O = M/N)	40.1%	11.5%
Market Effects (P = Difference of NTG of columns)	28.6%	n/a
Market Effects Lamps (Q = N*P)	1,423,060	n/a

Incorporating of Market Effects

As in prior years, the evaluation team recommends including past program influence (market effects) when calculating program savings and adding it in at the end of the program quadrennium. The evaluation team recommends this for the following reasons:

- The program seeks to have long-term market effects impacts that are likely being reflected in the program age variable.** The program incentives, and marketing and outreach, seek to impact customer awareness and demand for energy efficient lighting, as well as retailer stocking and promotion of efficient lighting. Program age can be thought of as a proxy for these effects, measuring long-term trends due to multiple years of running programs. These effects, therefore, should reflect positively, rather than negatively, in the NTG estimate.
- The savings are new estimates realized in 2021.** The change in market share due to prior program activities was realized in 2021 (i.e., prior program activities helped bump up the current market share). This represents increased sales of LEDs in 2021 that were not counted in prior years (i.e., they were not being double counted), and if they are not claimed in the current year they are program-induced impacts that are never credited at any time to program spending (past or present).
- The timing of expenditures and savings is already modified for the upstream lighting offering.** The gross savings analysis for the offering already accounts for the future installation of program lamps in the current offering year (i.e., although the first-year in-service rate is less than 100%, an installation trajectory is used to model and claim discounted savings for lamps that are installed in future years). Rather than accelerating future savings, as is done with the in-service rate, claiming impacts from prior expenditures is effectively using a lagged impact savings analysis. Savings that accrue today from programs in previous years, along with the savings from current programs, together comprise a reasonable estimate of energy efficiency offering impacts over the long term.

Applying Market Effects

To apply these market effects, the evaluation team recommends calculating the energy savings, incremental cost, EUL, and any other cost-effectiveness inputs for the year in which the market effects occurred then adding these benefits and costs back in at the end of the quadrennium. This is particularly important because the LED market is extremely dynamic, and these parameters can vary from year to year. As shown above, the additional lamps due to market effects for 2021 is 1,423,060 (the difference in net lift between the two scenarios), and the evaluation team recommends that the final average gross savings and incremental cost be applied to this total. To the extent a comparable model or approach is used in the future (and breaks out market effects), the evaluation team recommends a similar calculation be done for 2022, the final year in the current quadrennium, using the appropriate inputs in place for that year (i.e., the 2021 market effects lamps would use the gross savings and incremental cost in place for 2021, and any market effects lamps determined for 2022 would use the gross savings and incremental cost for 2022). Summing the totals for each year will determine the total additional market effects savings and costs over the quadrennium that can be applied to quadrennial impact and cost-effectiveness analysis.

Comparison to Prior Years

As shown in Table G-8, the NTG excluding market effects held fairly steady between CY 2016 and CY 2017, but dropped steeply from CY 2017 to CY 2019 and then dropped by about ten percentage points per year from CY 2019 to CY 2021. Looking at the LED market share trends above in the *Analysis of the Combined Dataset (Descriptive Statistics)* section, it is clear that 2018 was a watershed year in which LEDs began to displace sales of inefficient lamps, and the trend continued along with substantial gains in LED market share in non-program states in 2019, 2020, and 2021.

The NTG including market effects was approximately the same in CY 2021 as in CY 2020. The lower program activity in CY 2021 resulted in a lower NTG without market effects than 2020, but a higher NTG percentage with market effects due to the momentum of past years’ programs being spread across fewer 2021 bulbs. However, even at a lower NTG ratio without market effects than prior years, the program led to an additional 2 million LEDs being sold in Wisconsin in 2021 (see row M in Table G-7).

Table G-8. CY 2016 – CY 2021 Program Intensity and NTG Results

Value	CY 2016	CY 2017	CY 2019	CY 2020	CY 2021
Program Intensity					
Program \$ per household actual	\$4.13	\$4.23	\$4.26	\$3.98	\$2.65
Gross program LEDs	3,405,692	4,732,792	5,621,136	5,387,507	4,975,935
Predicted Market Lift					
LED counterfactual share (market effects scenario)	23.5%	28.9%	51.2%	71.6%	78.6%
LED modeled share	33.0%	41.7%	66.9%	80.1%	87.0%
Lift in LED share	9.5%	12.8%	15.7%	8.5%	8.4%
Net-to-Gross					
NTG – no market effects	46.7%	51.0%	29.5%	19.9%	11.5%
NTG with market effects	71.0%	71.6%	69.5%	39.2%	40.1%
Note this analysis was not performed for CY 2018.					

NTG Results by Bulb Style

Because the evaluation team did not have sufficient program data (e.g., spending by bulb style) across enough states to run separate NTG models by bulb style, it used an alternative approach. There are two key steps to the approach. First, the evaluation team compared LED market shares (by bulb style) in Wisconsin to LED market shares in non-program states.²⁴ Then, the evaluation team calibrated the findings from the first step to the results from the national lighting sales model (shown in Table G-7).

Table G-9 shows the comparison of LED market share by bulb type. The Lift column is simply the difference between the LED market share in Wisconsin and the LED market share in the aggregate non-program comparison state. For bulb styles other than reflectors, LED market shares in Wisconsin (86.5%) were significantly higher than in the aggregate non-program comparison state (67.1%). For reflectors, the LED share in Wisconsin (90.4%) was actually slightly lower than in the aggregate non-program comparison state (93.1%).

Table G-9. Comparison Between Wisconsin and Non-Program States

Bulb Style	WI LED Share	Non-Program LED Share	Lift
A-Lamps	87.3%	66.7%	20.5%
Globes and Candelabras	82.6%	68.8%	13.8%
Reflectors	90.4%	93.1%	-2.8%
Non-Reflectors ^a	86.5%	67.1%	19.3%

^a Calculated as the total of the A-lamps and globes/candelabras.

The lift in Table G-9 can be converted to bulbs by multiplying by the number of bulbs of the relevant style sold in Wisconsin during CY 2021. This math is shown in Table G-10. For each bulb style, Table G-10 also shows the number of bulbs distributed by the upstream lighting offering. Note the Lift (Bulbs) column is capped at 0 (in the case of negative lift) and 100% of the number of incented bulbs. Caps are applied because the small counts and the error bounds around the estimates may be skewing the NTG results when applied at the higher granularity.

²⁴ The non-program states in CY 2021 are Alabama, Kansas, Kentucky, Mississippi, Nebraska, Tennessee, and Wyoming. Bulb sales for these states are summed to create an aggregate non-program comparison state.

Table G-10. Calculating Lift as a Percentage of Upstream Lighting Offering Activity

Bulb Style	Lift (%)	WI Total Bulb Sales	Lift (Bulbs)	LEDs Incented by Upstream Lighting Offering	Lift as % of Upstream Lighting Offering
A-Lamps	20.5%	16,793,437	3,448,267	3,890,365	88.6%
Globes and Candelabras ^a	13.8%	3,528,801	293,473	293,473	100.0%
Reflectors	-2.8%	3,541,844	0	780,487	0.0%
Non-Reflectors ^b	19.3%	20,322,238	3,741,740	4,964,325	75.4%

^a Note that the lift as % upstream offering is capped at 0% and 100%.

^b Calculated as the total of the A-lamps and globes/candelabras.

Across all styles, the estimated lift is 3,741,740 bulbs. This total is greater than the net LEDs shown in row M in Table G-7 for both counterfactual approaches. The total lift in bulbs, therefore, is calibrated so that it sums to the total values shown Table G-7. For the Current and Past Influence counterfactual approach, the calibration factor is 53.4% (1,997,311/3,741,740), and for the Current Offering Spending and Age Influence the calibration factor is 15.3% (574,252/3,741,740). NTG by style (Table G-11) is then calculated by multiplying the last column in Table G-10 by each of the calibration factors.

Table G-11. NTG Results by Bulb Style

Bulb Style	Current and Past Influence	Current Offering Spending and Age Influence
A-Lamps	47.3%	13.6%
Globes and Candelabras	53.4%	15.3%
Reflectors	0.0%	0.0%
Non-Reflectors ^a	47.7%	13.7%

^a Calculated as the total of the A-lamps and globes/candelabras.

Self-Report Net-to-Gross Methodology

Two components—freeridership and participant spillover—constitute NTG. True freeriders are customers who would have purchased a measure without an offering’s influence. Participant spillover is the savings obtained by customers investing in additional energy-efficient measures or activities because of their participation.

This section presents the self-report approaches the evaluation team used to determine NTG for residential and nonresidential offerings. In summary, the team conducted participant surveys and used self-reported findings to calculate NTG ratios. It then applied these results to measure categories and offerings for which adequate baseline data were unavailable.

Survey Design

To assess NTG for offerings for which participating customer surveys were conducted in the CY 2021 evaluation, the evaluation team asked a series of freeridership and spillover questions. In CY 2021, participants were surveyed for Online Marketplace and Renewable Energy offerings.

For the CY 2021 self-report analysis, the evaluation team combined two types of freeridership to align with industry best practices:

- *Intention* freeridership relies on customers’ self-reported intention to purchase a measure in the absence of the offering. Survey items that addressed the offering’s effect on the efficiency, quantity, and timing of purchases.
- *Influence* freeridership relies on the influence of offering elements on the customer’s decision to purchase a measure. Offering influences could include Focus on Energy incentives, staff recommendations, or educational materials about energy efficiency.

The team estimates an *intention* freeridership score and an *influence* freeridership score ranging from 0% to 100% for each surveyed participant for each offering. These offering-level *intention* and *influence* freeridership scores are then calculated by weighting the individual freeridership component scores by respondents’ verified lifecycle gross savings.

By savings-weighting the *intention* methodology with an *influence* methodology, the evaluation team produces a freeridership score for the offering. The team calculates the arithmetic mean of *intention* and *influence* freeridership components to estimate final freeridership for the offering, as shown in the following equation:

$$\text{Final Freeridership} = \frac{\text{Intention FR Score} + \text{Influence FR Score}}{2}$$

The evaluation team designed the *intention* freeridership questions to elicit as accurately as possible the impact of a particular offering on the respondent’s decision to purchase high-efficiency equipment. Offerings can influence customer decisions in a variety of ways: participants may decide to purchase an energy-efficient measure sooner than planned, to purchase a higher efficiency measure than planned, or to purchase more units than planned without the offering. To understand the influence of the offering, the survey asks questions about what decision-makers might have done in its absence.

Direct questions such as, “Would you have installed measure X without the offering incentive?” tend to result in exaggerated *yes* responses. Participants often provide answers they believe surveyors seek, so such a question becomes the equivalent of asking: “Would you have done the right thing on your own?” Effectively avoiding such bias involves asking a question in several different ways and checking for consistent responses.

Basing *intention* freeridership estimates on a series of questions, rather than a single question, helps the evaluation team recognize and minimize response biases. Not all questions are weighted equally. For example, respondents who would not have installed the measure(s) to the same level of efficiency without the offering are automatically 0% *intention* freeriders. If nonresidential participants would not

have installed the measure(s) within two years without the offering, they are automatically 0% *intention* freeriders. The team assigns other questions included in the *intention* freeridership analysis partial weights for responses that are indicative of a non-freerider.

The survey questions address five core dimensions of *intention* freeridership for residential offerings and six core intention freeridership dimensions for nonresidential offerings, as listed below:

- Would participants have installed measures without the offering?
- Were participants planning on ordering or installing the measures before learning about the offering?
- Would participants have installed the measures at the same efficiency levels without the offering incentive?
- Would participants have installed the same quantity of measures without the offering?
- In the absence of the offering, would participants have installed the measures at a different time?
- Was the purchase of the measures in the organization’s most recent capital budget (nonresidential only)?

Specific intention freeridership questions used for the offerings are presented in their individual analysis sections in this appendix.

Persistent conjecture in the industry, however, indicates intention self-reports may be subject to biases, yielding an inflated freeridership value. To address this possibility and to provide a triangulation of approaches to the estimate, in CY 2020 the evaluation team began integrating a second set of survey questions designed to measure the offering’s perceived influence on the respondents’ purchasing decisions.

To estimate offering influence, the survey asks respondents to rate the influence of five offering elements on their purchasing decisions. Responses are captured using a 1 to 5 scale, with 1 meaning *not at all important* and 5 meaning *very important*. A surveyed participant’s overall influence rating equals the maximum influence of any single offering element. This draws upon an underlying principle: if a single element had a substantial influence on a respondent’s purchasing decision, the offering has successfully influenced the respondent.

Intention Freeridership Methodology

For the CY 2021 evaluation, the team used a probability matrix to assign a single *intention* freeridership score to each participant, using his or her responses to targeted survey questions.²⁵ The team applied *intention* freeridership scores to question response patterns in the probability matrix.

²⁵ Khawaja, M. S. 2007 edition. *The N/APEE Handbook on DSM Evaluation*. p. 5-1.

This matrix approach provides these key benefits:

- Derivation of a partial *intention* freeridership score, based on the likelihood of a respondent taking similar actions in the offering's absence
- Use of a rules-based approach for consistency among multiple respondents
- Ability to change weightings in a what if exercise, testing the response set's stability

The evaluation team's method offers the advantage of partial *intention* freeridership. Experience has shown that participants do not fall neatly into freerider and non-freerider categories. For example, the team assigned partial *intention* freeridership scores to participants who had plans to install a measure; that is, although the offering exerted some influence over their decisions, these respondents were also influenced by other market factors outside of the offering. Further, the team could assign partial credit to "don't know" and "refused" responses, rather than removing respondents entirely from the analysis.

The evaluation team converted each participant survey response into *intention* freeridership matrix terminology, combined each participant's converted responses to assign an *intention* freeridership score from the matrix, and aggregated all participants into an average *intention* freeridership score for the entire offering category, ultimately assessing *intention* freeridership at three different levels.

Response Conversion to Matrix Terminology

The evaluation team independently evaluated each response, assessed it for *intention* freeridership, and converted it into one of these values:

- Yes (indicative of freeridership)
- No (indicative of non-freeridership)
- Partial (partially indicative of freeridership)

Participant Intention Freeridership Scoring

Following conversion of survey responses into matrix terminology, the team created an *intention* freeridership matrix for each offering. The team's process for determining an *intention* freeridership score is as follows:

- Customers were categorized as 0% intention freeriders in these instances:
 - They had no plans to install the measure in the absence of the offering's incentives and would not have installed the measure within a year for residential offerings and within two years for nonresidential offerings.
 - They had specific plans to install the measure before learning about the offering but would not have done so without offering incentives.
 - In the absence of offering incentives, the customer would not have purchased or installed equipment to the same level of efficiency.
- Customers were categorized as 100% intention freeriders if they would have installed the measure without the offering or if they had installed the measure before learning about the offering.

- Customers received a partial *intention* freeridership score (ranging from 12% to 75%) if they had plans to install the measure and their decision was influenced by the offering. (This influence may have been installation timing, the number of measures installed, or the efficiency levels of measures installed.) For customers who were highly likely to install a measure and for whom the offering had less influence over their decision, the team applied a higher *intention* freeridership percentage.

Measure Category *Intention* Freeridership Scoring

After assigning an *intention* freeridership score to every survey respondent, the evaluation team calculated a savings-weighted average *intention* freerider score for the measure category. For each offering, the respondents' *intention* freerider scores were individually weighted by estimated savings of equipment installed using the following calculation:

$$\text{Savings Weighted } \textit{Intention} \text{ Freeridership} = \frac{\sum[\text{Respondent } \textit{Intention} \text{ Freerider Score}] * [\text{Verified Measure Lifecycle Gross Energy Savings}]}{\sum[\text{All Respondents Verified Measure Lifecycle Gross Energy Savings}]}$$

Influence Freeridership Methodology and Scoring

To estimate an *influence* freeridership score for the CY 2021 evaluation, the evaluation team asked respondents to rate the importance of offering elements on their purchasing decisions. The surveys captured responses using a five-point scale, with 1 meaning *not at all important* and 5 meaning *very important*. A surveyed participant's overall influence rating equaled the maximum importance of any single offering element. This methodology was based on an underlying principle: if a single element had a substantial influence on a respondent's purchasing decision, the offering successfully influenced the respondent.

For example, the team included the survey question shown in Table G-12 to capture respondents' perspectives on elements driving them to take energy-efficient actions.²⁶ A rating of 5 represents the offering's maximum influence, which determined the influence freeridership component score.

²⁶ The question wording and program factors in surveys may vary slightly depending on the specific program component. The *Influence Freeridership Analysis* sections in the specific program chapters list factors included for each specific program component.

Table G-12. Example of Influence Freeridership Component Question

I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the energy-efficient [MEASURE][s].							
Rate Influence of Offering Elements							
	1 - Not at all important	2	3	4	5 - Very important	Don't Know	Not Applicable
The Focus on Energy incentive or discount	1	2	3	4	5	DK	N/A
Recommendation from Focus on Energy Staff	1	2	3	4	5	DK	N/A
Information provided by Focus on Energy on energy-savings opportunities	1	2	3	4	5	DK	N/A
Recommendation from contractor or vendor	1	2	3	4	5	DK	N/A
Previous participation in a Focus on Energy efficiency offering	1	2	3	4	5	DK	N/A

High offering-influence levels and influence freeridership maintain an inverse relationship: the greater the offering's influence, the lower the participant's final influence freeridership score. Table G-13 presents the freeridership level implied by each influence rating.

Table G-13. Influence Freeridership Implied by Response to Influence Items

Influence Rating	Influence Freeridership Score
1 - Not at all important	100%
2	75%
3	50%
4	25%
5 - Very important	0%
Don't know	50%
Not applicable	50%

Measure Category Influence Freeridership Scoring

After assigning an *influence* freeridership score to every survey respondent, the evaluation team calculated a savings-weighted average *influence* freerider score for the measure category. For each offering, the respondents' *influence* freerider scores were individually weighted by estimated savings of equipment installed using the following calculation:

$$\text{Savings Weighted Influence Freeridership} = \frac{\sum[\text{Respondent Influence Freerider Score}] * [\text{Verified Measure Lifecycle Gross Energy Savings}]}{\sum[\text{All Respondents Verified Measure Lifecycle Gross Energy Savings}]}$$

Spillover Methodology

Spillover refers to additional savings generated by offering participants following their participation but not captured by offering records. Spillover occurs when participants choose to purchase energy-efficient measures or adopt energy-efficient practices because of an offering’s influence but they do not receive offering incentives from a utility or another organization.

The evaluation team measured spillover by asking a sample of participants who purchased and received an incentive for a particular measure if they installed another efficient measure or undertook another energy efficiency activity because of the offering. Respondents were asked to rate the offering’s (and incentive’s) relative influence (either *very important*, *somewhat important*, *neutral*, *not too important*, or *not at all important*) on their decisions to pursue additional savings.

Participant Spillover Analysis

The evaluation team used a top-down approach to calculate spillover savings. Analysis began with a subset comprising only the survey respondents who indicated they had installed additional energy-saving measures after participating in the offering. The team screened out any respondents who received an incentive for these additional measures. It also removed respondents if they indicated the offering had little influence on their decisions to purchase additional measures, thus retaining only those respondents who rated the offering as *very important*.

The evaluation team applied evaluated and deemed savings to the spillover measures respondents said they had installed as a result of their participation. The team calculated a spillover percentage per offering category by dividing the sum of additional spillover savings reported by respondents for a given offering category by total gross savings achieved by all respondents in the offering category, as in the following equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Lifecycle Gross Energy Savings for All Survey Respondents}}{\sum \text{Offering Measure Verified Lifecycle Gross Energy Savings}}$$

Net-to-Gross Analysis

The evaluation team combined this spillover information with the offering-level freeridership results to achieve the NTG ratio, using the following calculation:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

Table G-14 lists self-report CY 2021 participant freeridership, spillover, and NTG results by offering.

Table G-14. CY 2021 Self-Report Participant Freeridership, Spillover and NTG by Offering

Offering	Measure	n	Freeridership ^a	Spillover	NTG
Residential Offering					
Online Marketplace	Advanced Power Strips	65	17%	3%	86%
	Faucet Aerators	145	19%	3%	84%
	LEDs, 3-way	41	24%	3%	79%
	LEDs, Decorative	45	14%	3%	89%
	LEDs, Globe	93	21%	3%	82%
	LEDs, Reflector	88	23%	3%	85%
	LEDs, Omnidirectional	81	23%	3%	80%
	Showerheads	91	17%	3%	86%
	Smart Thermostats	78	17%	5%	88%
Renewable Energy	Solar PV, Residential	70	58%	1%	42%
	Solar PV, Commercial	38	38%	0%	62%

^a Weighted by CY 2021 verified lifecycle MMBtu gross energy savings.

Self-Report NTG Methodology and Findings – Online Marketplace Offering, Smart Thermostats

The evaluation team applied slightly different approaches to calculate NTG for smart thermostats and non-thermostat measures in the Online Marketplace offering.

Freeridership – Smart Thermostats

Intention Freeridership Survey Questions

The participant survey’s *intention* freeridership section included six questions, addressing the five core freeridership dimensions for residential offerings:

- E15. When did you first hear about the availability of a Focus on Energy discount for smart thermostats? Was it....?
- E16. [ASK IF E15= 2, 3, 4] So just to be clear, you purchased your smart thermostat before you heard anything about the Focus on Energy Focus on Energy discount. Is that correct?
- E17. Before you heard about the Focus on Energy discount, had you already considered purchasing a smart thermostat?
- E18. Without the discount from Focus on Energy, what kind of thermostat would you have purchased?
- E19. [ASK IF QUANTITY > 1] Would you have purchased the same quantity of smart thermostats without the discount from Focus on Energy?
- E20. Thinking about timing, without the Focus on Energy discount, would you have purchased the smart thermostat ...?

Convert Responses to Matrix Terminology

Table G-15 shows how the initial survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of *intention* freeridership (in parentheses).

Table G-15. Online Marketplace Offering – Smart Thermostats – Raw Survey Response Translation to *Intention* Freeridership Scoring Matrix Terminology

E15. When did you first hear about the availability of a Focus on Energy discount for smart thermostats? Was it...	E16. [ASK IF E15= 2, 3, 4] So just to be clear, you purchased your smart thermostat before you heard anything about the Focus on Energy discount. Is that correct?	E17. Before you heard about the Focus on Energy discount, had you already considered purchasing a smart thermostat?	E18. Without the discount from Focus on Energy, what kind of thermostat would you have purchased?	E19. [ASK IF QUANTITY > 1] Would you have purchased the same quantity of smart thermostats without the discount from Focus on Energy?	E20. Thinking about timing, without the Focus on Energy discount, would you have purchased the smart thermostat ...?
Before you started shopping (No)	Yes, that's correct (Yes)	Yes (Yes)	A smart or learning thermostat (Yes)	Yes, the same quantity (Yes)	At the same time (Yes)
When you received your order confirmation (Yes)	No, that's not correct (No)	No (No)	A Wi-Fi thermostat (non-learning) (Partial2)	No, would have purchased fewer (Partial2)	Later, but within 12 months (Partial2)
After you purchased the smart thermostat (Yes)	Don't Know (Partial)	Don't Know (Partial)	A programmable thermostat (No)	No, would have purchased more (Yes)	One to two years out (No)
You had not heard of Focus on Energy before this survey (Yes)			A manual thermostat (No)	No, would not have purchased anything at all (No)	More than two years out (No)
Don't Know (No)			Would not have purchased a new thermostat (No)	Don't Know (Partial)	Never (No)
			Don't Know (Partial)		Don't Know (Partial)

Participant Intention Freeridership Scoring

The *intention* freeridership score started with 100%, which the evaluation team decremented based on the participant's responses to the six questions, as shown in Table G-16.

Table G-16. Online Marketplace Offering – Smart Thermostats – *Intention* Freeridership Scoring Legend

Question Number	Decrement
E15	0% decrement for "No," Partial level not needed
E16	100% FR if "Yes," "Partial" level not needed
E17	50% decrement for "No," 25% decrement for "Partial"
E18	100% decrement for "No," 25% decrement for "Partial," 50% decrement for 'Partial2'
E19	100% decrement for "No," 25% decrement for "Partial," 50% decrement for 'Partial2'
E20	100% decrement for "No," 25% decrement for "Partial," 50% decrement for 'Partial2'

Intention Freeridership Analysis

Table G-17 shows the unique response combinations from Online Marketplace Offering smart thermostat participants to the *intention* freeridership questions (actual responses mapped to *yes*, *no*, or *partial*, as indicative of freeridership), the *intention* freeridership score assigned to each combination, and number of responses. The evaluation team calculated an *intention* freeridership score for the smart thermostat measure based on the savings-weighted average of distribution of scores within the matrix.

Table G-17. Online Marketplace Offering – Smart Thermostats – Frequency of *Intention* Freeridership Scoring Combinations

E15. When did you first hear about the availability of a Focus on Energy discount for smart thermostats? Was it...	E16. [ASK IF G1= 2, 3, 4] So just to be clear, you purchased your smart thermostat before you heard anything about the Focus on Energy Focus on Energy discount. Is that correct?	E17. Before you heard about the Focus on Energy discount, had you already considered purchasing a smart thermostat?	E18. Without the discount from Focus on Energy, what kind of thermostat would you have purchased?	E19. [ASK IF QUANTITY > 1] Would you have purchased the same quantity of smart thermostats without the discount from Focus on Energy?	E20. Thinking about timing, without the Focus on Energy discount, would you have purchased the smart thermostat ...?	<i>Intention</i> Freerider Score	Count
Yes	Yes	-	-	-	-	100%	1
Yes	No	Yes	Partial	-	Partial	50%	1
No	-	Yes	Yes	Yes	Yes	100%	2
No	-	Yes	Yes	-	Yes	100%	4
No	-	Yes	Yes	-	Partial	75%	4
No	-	Yes	Yes	-	Partial2	50%	15
No	-	Yes	Yes	-	No	0%	3
No	-	Yes	Partial2	Yes	Yes	50%	1
No	-	Yes	Partial	-	Partial	50%	3
No	-	Yes	Partial	-	Partial2	25%	2
No	-	Yes	Partial2	-	Yes	50%	8
No	-	Yes	Partial2	-	Partial	25%	1
No	-	Yes	Partial2	-	Partial2	12.5%	9
No	-	Yes	No	-	-	0%	18
No	-	No	Yes	-	Partial	25%	1
No	-	No	Yes	-	Partial2	12.5%	1
No	-	No	Partial2	No	-	0%	1
No	-	No	Partial2	-	Partial2	0%	2
No	-	No	No	-	-	0%	14

Table G-18 shows the Online Marketplace Offering smart thermostat *intention* freeridership score.

Table G-18. Online Marketplace Offering – Smart Thermostats – *Intention* Freeridership Results

Measure Category	n	<i>Intention</i> FR Score
Smart Thermostat	91	29% ^a

^a Weighted by verified lifecycle MMBtu gross energy savings.

Influence Freeridership Analysis

The evaluation team assessed *influence* freeridership by asking participants how important various offering elements were in their purchasing decisions. Table G-19 shows how participants rated importance, along with a count and average rating for each factor.

Table G-19. Online Marketplace Offering – Smart Thermostats – *Influence* Freeridership Responses

Influence Rating	Influence FR Score	Focus on Energy cash-back incentive or discount	Recommendation from Focus on Energy Staff	Information provided by Focus on Energy on energy savings opportunities	Recommendation from store representative, dealer, or contractor	Previous participation in a Focus on Energy efficiency offering
1 - Not at all important	100%	0	18	3	29	7
2	75%	1	13	6	11	2
3	50%	4	15	20	10	14
4	25%	15	6	22	2	27
5 - Very important	0%	69	12	37	9	34
Don't know	50%	0	0	0	0	0
Average Rating		4.8	3.1	4.3	4.3	2.7

The evaluation team determined each respondent’s *influence* freeridership score for each measure category, using the maximum rating provided for any factor included in Table G-19. As shown in Table G-20, the respondents’ maximum influence ratings ranged from 1 (*not at all important*) to 5 (*very important*). A maximum score of 1 means the customer ranked all factors from the Table as *not at all important*, while a maximum score of 5 means the customer ranked at least one factor *very important*. Counts refer to the number of “maximum influence” responses for each factor, or *influence* freeridership score, response option.

Table G-20. Online Marketplace Offering – Smart Thermostats – *Influence* Freeridership Score

Maximum Influence Rating	<i>Influence</i> FR Score	Count
1 - Not at all important	100%	0
2	75%	0
3	50%	3
4	25%	12
5 - Very important	0%	76
Don't know	50%	0
Average Maximum Influence Rating - Simple Average		4.8
Average Influence Score - Weighted by Verified Lifecycle MMBtu Gross Savings		5%

Final Freeridership

The evaluation team calculated the mean of the overall intention and the overall influence of freeridership components to estimate final freeridership for the measure categories. A higher freeridership score means more savings are deducted from the gross savings estimates. Table G-21 lists intention, influence, and final freeridership scores by measure category for the Online Marketplace Offering.

Table G-21. Online Marketplace Offering – Smart Thermostats – Freeridership Score

Measure Category	n	Intention FR Score	Influence FR Score	Final FR Score
Smart Thermostats	91	29% ^a	5% ^a	17%

^a Weighted by verified lifecycle MMBtu gross energy savings.

Freeridership – Non-thermostat Measures

Intention Freeridership Survey Questions

The participant surveys included the following *intention* freeridership question that collected measure-specific responses for non-thermostat measures:

- D13/F15/G10/H10/I7. If the Focus on Energy discount had not been available, would you have bought [MEASURE]s for your home within 12 months?

Table G-22 shows how the initial survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of freeridership (in parentheses).

Table G-22. Online Marketplace Offering – Non-Thermostat Measures – Raw Survey Response Translation to *Intention* Freeridership Scoring Matrix Terminology

D13/F15/G10/H10/I7. Thinking specifically about [MEASURE]s, if the Focus on Energy discount had not been available, would you have bought [MEASURE]s for your home within 12 months?
Yes, at the same time (Yes)
Yes, later but within the next 12 months (Partial)
No, not within 12 months (No)
No, already had them in all available locations (Yes)
Don't Know (Partial)

Participant Intention Freeridership Scoring

Each *intention* freeridership score started at 100%, which the evaluation team decremented based on the participant’s responses, shown in Table G-23.

Table G-23. Online Marketplace Offering – Non-Thermostat Measures – *Intention* Freeridership Scoring Legend

Question Number	Decrement
D13/F15/G10/H10/I7	100% decrement for "No," 50% decrement for "Partial"

Intention Freeridership Analysis Results

Table G-24 shows the unique response distribution from Online Marketplace Offering *intention* freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership) for non-thermostat measures, the intention freeridership score assigned to each response, the number of responses for each measure, and an intention freeridership score for each measure based on the savings weighted average of the distribution of *intention* freeridership scores.

Table G-24. Online Marketplace Offering – Non-Thermostat Measures – Frequency of Initial *Intention* Freeridership Scoring Combinations

D13/F15/G10/H10/I7. Thinking specifically about [MEASURE]s, if the Focus on Energy discount had not been available, would you have bought [MEASURE]s for your home within 12 months?	<i>Intention</i> FR Score	LEDs, Omnidirectional	LEDs, Reflector	LEDs, 3-way	LEDs, Decorative	LEDs, Globe	Advanced Power Strip	Faucet Aerators	Showerheads	Pipe Wrap
Yes	100%	20	21	11	7	20	9	24	23	1
Partial	50%	35	38	14	13	38	22	37	30	7
No	0%	26	29	16	25	35	34	84	46	10
Average Intention Score - Weighted by Verified Lifecycle MMBtu Gross Energy Savings		44%	34%	45%	25%	39%	31%	27%	37%	25%

Influence Freeridership Analysis

The evaluation team assessed *influence* freeridership by asking participants how important various offering elements were in their purchasing decisions. The team determined each respondent’s *influence* freeridership score for each measure category, using the maximum rating provided for any of the elements related to Focus on Energy listed below.

- Focus on Energy cash-back incentive or discount
- Recommendation from Focus on Energy staff
- Information provided by Focus on Energy on energy-savings opportunities
- Previous participation in a Focus on Energy efficiency offering or program

As shown in Table G-25, the respondents’ maximum influence ratings ranged from 1 (*not at all important*) to 5 (*very important*). A maximum score of 1 means the customer ranked all factors from the Table as *not at all important*, while a maximum score of 5 means the customer ranked at least one factor *very important*. Counts refer to the number of “maximum influence” responses for each factor, or *influence* freeridership score, response option.

Table G-25. Online Marketplace Offering – Non-Thermostat Measures – Influence Freeridership Score

Maximum Influence Rating	Influence FR Score	LEDs, Omnidirectional	LEDs, Reflector	LEDs, 3-way	LEDs, Decorative	LEDs, Globe	Advanced Power Strip	Faucet Aerators	Showerheads	Pipe Wrap
1 - Not at all important	100%	0	0	0	0	0	0	7	0	0
2	75%	0	1	0	0	0	0	3	0	0
3	50%	0	0	0	0	2	0	4	0	0
4	25%	7	8	4	4	4	5	19	16	4
5 - Very important	0%	74	79	37	41	87	60	112	83	14
Average Maximum Influence Rating - Simple Average		4.9	4.9	4.9	4.9	4.9	4.9	4.6	4.8	4.8
Average Influence Score - Weighted by Verified Lifecycle MMBtu Gross Energy Savings		2%	2%	3%	2%	2%	2%	10%	4%	5%

Final Freeridership

The evaluation team calculated the mean of the overall *intention* and the overall *influence* of freeridership components to estimate final freeridership for the measure categories. A higher freeridership score translates to more savings that are deducted from the gross savings estimates. Table G-26 lists the *intention*, *influence*, and final freeridership scores for non-thermostat measures in the Online Marketplace Offering.

Table G-26. Online Marketplace Offering – Non-Thermostat Measures – Freeridership Score

Measure Category	n	Intention Freeridership Score ^a	Influence Freeridership Score ^a	Final Freeridership Score
LEDs, Omnidirectional	81	44%	2%	23%
LEDs, Reflector	88	34%	2%	18%
LEDs, 3-way	41	45%	3%	24%
LEDs, Decorative	45	25%	2%	14%
LEDs, Globe	93	39%	2%	21%
Advanced Power Strip	65	31%	2%	17%
Faucet Aerators	145	27%	10%	19%
Showerheads	99	37%	4%	21%
Pipe Wrap	18	25%	5%	15%

^a Weighted by verified lifecycle MMBtu gross energy savings.

Participant Spillover Analysis

The evaluation team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Online Marketplace Offering. The team applied evaluated and deemed savings to the spillover measures that customers said they had installed as a result of their offering participation, presented in Table G-27.

Table G-27. Online Marketplace Offering – Total Offering – Spillover Measures and Savings

Measure Category	Spillover Measure	Quantity	Total MMBtu Lifecycle Gross Savings Estimate
Total Offering	ENERGY STAR Air Purifier	1	6.6
	ENERGY STAR Freezer	2	2.6
	ENERGY STAR Room Air Conditioner	3	3.7
	Gas Furnace	3	137.2
	Smart Thermostat	2	90.0

Next, the team divided the sample spillover savings by the offering measure category gross savings from the entire survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Offering Measure Energy Savings for All Survey Respondents}}$$

This yielded a 3% spillover estimate for the Online Marketplace Offering, when rounded to the nearest whole percentage (Table G-28). The evaluation team estimated one spillover ratio for the Online Marketplace Offering then applied this estimate to each measure because participants could purchase multiple measures.

Table G-28. Online Marketplace Offering – Total Offering – Spillover Percentage Estimate

Variable	Total Lifecycle MMBtu Savings Estimate
Spillover Savings	240
Offering Savings	7,061
Spillover Estimate	3%

Final Net-to-Gross Analysis

The evaluation team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table G-29:

$$NTG = 1 - \text{Freeridership} + \text{Spillover}$$

Table G-29. Online Marketplace Offering – NTG Estimate

Measure Category	n	Freeridership	Spillover	NTG
Smart Thermostats	91	17% ^a	3%	86%
LEDs, Omnidirectional	81	23%	3%	80%
LEDs, Reflector	88	18%	3%	85%
LEDs, 3-way	41	24%	3%	79%
LEDs, Decorative	45	14%	3%	89%
LEDs, Globe	93	21%	3%	82%
Advanced Power Strip	65	17%	3%	86%
Faucet Aerators	145	19%	3%	84%
Showerheads	99	21%	3%	82%
Pipe Wrap	18	15%	3%	88%

^a Weighted by verified lifecycle MMBtu gross energy savings.

Self-Report NTG Methodology and Findings – Renewable Energy Offering

Freeridership

Intention Freeridership Survey Questions

- The participant survey’s residential *intention* freeridership section included five questions, addressing the five core freeridership dimensions:
- C1. When did you first hear about the availability of the Focus on Energy Renewable Energy incentive for solar PV systems?
- C2. [Ask IF C1=3, 4 OR 5] So just to be clear, you purchased your solar PV system before you heard anything about the Focus on Energy incentive. Is that correct?
- C3. Before you heard about the program, had you already considered installing a solar PV system?
- C4. What would you have done differently if the Focus on Energy Renewable Energy offering had not been available to you? Would you have...
- C6. Thinking about timing, without the Focus on Energy rebate, would you have installed the solar PV system...?
- The participant survey’s commercial *intention* freeridership section included five questions, addressing the five core freeridership dimensions:
- D1. First, did your organization decide to install the PV system[s] before learning about the Focus on Energy incentive?
- D2. [ASK IF D1=1] Prior to learning about the Focus on Energy incentive, was the purchase of the solar PV system[s] included in your property’s capital budget?
- D3. [ASK IF D2=1] Had your property ALREADY ordered or purchased the solar PV system[s] BEFORE your property heard about the Focus on Energy incentive?
- D4. What would you have done differently if the Focus on Energy incentive had not been available to you? Would you have...
- D6. Without the incentive for the solar PV system [s] and information or education from Focus on Energy, would you have installed the solar PV system[s]...?

Convert Responses to Matrix Terminology

Table G-30 shows how the initial residential survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of *intention* freeridership (in parentheses).

Table G-30. Renewable Energy Offering Raw Survey Response Translation to *Intention* Freeridership Scoring Matrix Terminology – Residential

C1. When did you first hear about the availability of the Focus on Energy Renewable Rewards Program incentive for solar PV systems? Was it....	C2. [ASK IF C1=3, 4 OR 5] So just to be clear, you purchased your solar PV system before you heard anything about the Focus on Energy Renewable Energy incentive. Is that correct?	C3. Before you heard about the program, had you already considered installing a solar PV system?	C4. What would you have done differently if the Focus on Energy Renewable Energy Program had not been available to you? Would you have...	C6. Thinking about timing, without the Focus on Energy rebate, would you have installed the solar PV system...?
Before you contacted your contractor to purchase a system (No)	Yes, that’s correct (Yes)	Yes (Yes)	Installed a smaller, less expensive PV system (Yes)	At the same time (Yes)
When the contractor provided the quote for purchase and installation (No)	No, that’s not correct (No)	No (No)	Installed same size, same-cost PV system (Yes)	Later, but within 12 months (Partial2)
After your contractor installed your system (Yes)	Don't Know (Partial)	Don't Know (Partial)	Installed a larger, more expensive PV system (Yes)	One to two years out (No)
When you received your incentive check from Focus on Energy (Yes)			Not installed a PV system at all (No)	More than two years out (No)
You had not heard of Focus on Energy before this (Yes)			Don't Know (Partial)	Never (No)
Don't Know (No)				Don't Know (Partial)

Table G-31 shows how the initial commercial survey responses were translated into the responses *yes*, *no*, or *partially*, indicative of *intention* freeridership (in parentheses).

Table G-31. Renewable Energy Offering Raw Survey Response Translation to *Intention* Freeridership Scoring Matrix Terminology – Commercial

D1. First, did your organization decide to install the solar PV system[s] before learning about the Focus on Energy incentive?	D2. [ASK IF D1=1] Prior to learning about the Focus on Energy incentive, was the purchase of the solar PV system[s] included in your property’s capital budget?	D3. [ASK IF D2=1] Had your property ALREADY ordered or purchased the PV system[s] BEFORE your property heard about the Focus on Energy incentive?	D4. [ASK IF B1=2] What would you have done differently if the Focus on Energy incentive had not been available to you? Would you have...	D6. Without the incentive for the solar PV system[s] and information or education from Focus on Energy, would you have installed the solar PV system[s]...?
Yes (Yes)	Yes (Yes)	Yes (Yes)	Installed a smaller, less expensive PV system (Yes)	Within the same year (Yes)
No (No)	No (No)	No (No)	Installed same size, same-cost PV system (Yes)	Within one to two years (Partial2)
Don't Know (Partial)	Don't Know (Partial)	Don't Know (Partial)	Installed a larger, more expensive PV system (Yes)	Within three to five years (No)
			Not installed a PV system at all (No)	In more than five years (No)
			Don't Know (Partial)	Never (No)
				Don't Know (Partial)

Participant Intention Freeridership Scoring

The *intention* freeridership score started with 100%, which the evaluation team decremented based on the participant’s responses to the five questions, as shown in Table G-32 and Table G-33.

Table G-32. Renewable Energy *Intention* Freeridership Scoring Legend – Residential

Question Number	Decrement
C1	0% decrement for "No," Partial level not needed
C2	100% FR if "Yes," "Partial" level not needed
C3	50% decrement for "No," 25% decrement for "Partial"
C4	100% decrement for "No," 25% decrement for "Partial"
C6	100% decrement for "No," 25% decrement for "Partial"

Table G-33. Renewable Energy *Intention* Freeridership Scoring Legend – Commercial

Question Number	Decrement
D1	50% decrement for "No," Partial level not needed
D2	50% decrement for "No," Partial level not needed
D3	100% FR if "Yes," "Partial" level not needed
D4	100% decrement for "No," 25% decrement for "Partial"
D6	100% decrement for "No," 25% decrement for "Partial," 50% decrement for "Partial2"

Intention Freeridership Analysis

Table G-34 and Table G-35 show the unique response combinations from residential solar PV and commercial solar PV participants, respectively, answering the Renewable Energy Offering *intention* freeridership questions (actual responses mapped to yes, no, or partial, as indicative of freeridership), the *intention* freeridership score assigned to each combination, and the number of responses. The evaluation team calculated an *intention* freeridership score for the offering based on the distribution of scores within the matrix.

Table G-34. Renewable Energy Offering Frequency of *Intention* Freeridership Scoring Combinations – Residential

C1. When did you first hear about the availability of the Focus on Energy Renewable Rewards Program incentive for solar PV systems? Was it...	C2. [ASK IF C1=3, 4 OR 5] So just to be clear, you purchased your solar PV system before you heard anything about the Focus on Energy Renewable Energy incentive. Is that correct?	C3. Before you heard about the program, had you already considered installing a solar PV system?	C4. What would you have done differently if the Focus on Energy Renewable Energy Program had not been available to you? Would you have...	C6. Thinking about timing, without the Focus on Energy rebate, would you have installed the solar PV system...?	<i>Intention</i> Freerider Score	Count
Yes	Yes	-	-	-	100%	9
Yes	No	Yes	Yes	Yes	100%	1
No	-	Yes	Yes	No	0%	2
No	-	Yes	Yes	Yes	100%	34
No	-	Yes	Yes	Partial2	50%	4
No	-	Yes	No	-	0%	2
No	-	No	Yes	Yes	50%	8
No	-	No	Yes	Partial	25%	1
No	-	No	Yes	Partial2	12.5%	1
No	-	No	Yes	No	0%	2
No	-	No	No	-	0%	6

Table G-35. Renewable Energy Program Frequency of *Intention* Freeridership Scoring Combinations – Commercial

D1. First, did your organization decide to install the solar PV system[s] before learning about the Focus on Energy incentive?	D2. [ASK IF D1=1] Prior to learning about the Focus on Energy incentive, was the purchase of the solar PV system[s] included in your property’s capital budget?	D3. [ASK IF D2=1] Had your property ALREADY ordered or purchased the PV system[s] BEFORE your property heard about the Focus on Energy incentive?	D4. [ASK IF B1=2] What would you have done differently if the Focus on Energy incentive had not been available to you? Would you have...	D6. Without the incentive for the solar PV system[s] and information or education from Focus on Energy, would you have installed the solar PV system[s]...?	<i>Intention</i> Freerider Score	Count
Yes	Yes	Yes	-	-	100%	1
Yes	Yes	No	-	Yes	100%	1
Yes	Yes	No	Yes	Yes	100%	5
Yes	Yes	No	Yes	Partial2	50%	2
Yes	Yes	No	No	-	0%	1
Yes	Partial	-	-	Yes	75%	2
Yes	No	-	-	Yes	50%	2
Yes	No	-	-	Partial	25%	2
Yes	No	-	-	Partial2	0%	4
Partial	-	-	-	Yes	75%	1
Partial	-	-	-	No	0%	1
No	-	-	-	Yes	50%	6
No	-	-	-	Partial	25%	3
No	-	-	-	Partial2	0%	4
No	-	-	-	No	0%	3

Table G-36 shows the Renewable Energy Offering *intention* freeridership score.

Table G-36. Renewable Energy Offering – *Intention* Freeridership Results

Measure Category	n	<i>Intention</i> FR Score
Solar PV, Residential	70	75% ^a
Solar PV, Commercial	38	56% ^a

^a Weighted by verified lifecycle MMBtu gross energy savings.

Influence Freeridership Analysis

The evaluation team assessed *influence* freeridership by asking participants how important various offering elements were in their purchasing decisions. Table G-37 shows how participants rated importance, along with a count and average rating for each factor.

Table G-37. Renewable Energy Offering *Influence* Freeridership Responses – Solar PV

Influence Rating	Influence FR Score	The Focus on Energy program rebate or discount		Recommendation from Focus on Energy Staff		Information provided by Focus on Energy on energy savings opportunities		Previous participation in a Focus on Energy efficiency program	
		Residential	Commercial	Residential	Commercial	Residential	Commercial	Residential	Commercial
1 - Not at all important	100%	16	1	43	18	23	3	33	16
2	75%	12	2	8	8	18	7	13	6
3	50%	16	13	11	4	17	16	13	7
4	25%	15	5	8	3	9	4	4	5
5 - Very important	0%	11	16	0	4	3	7	7	4
Don't know	50%	16	1	0	1	0	1	0	0
Average Rating		2.9	3.9	1.8	2.1	2.3	3.1	2.1	2.0

The team then determined each respondent’s *influence* freeridership score for each measure category, using the maximum rating provided for any factor included in Table G-37. As shown in Table G-38, the respondents’ maximum influence ratings ranged from 1 (*not at all important*) to 5 (*very important*), as shown in . A maximum score of 1 means the customer ranked all factors from the Table as *not at all important*, while a maximum score of 5 means the customer ranked at least one factor *very important*. Counts refer to the number of “maximum influence” responses for each factor, or *influence* freeridership score, response option.

Table G-38. Renewable Energy Offering *Influence* Freeridership Score – Solar PV

Maximum Influence Rating	<i>Influence</i> Freeridership Score	Residential Count	Commercial Count
1 - Not at all important	100%	10	0
2	75%	9	1
3	50%	11	11
4	25%	21	7
5 - Very important	0%	19	19
Don't know	50%	0	0
Average Maximum Influence Rating - Simple Average		3.4	4.2
Average Influence Score - Weighted by Verified Lifecycle MMBtu Gross Savings		41%	20%

Final Freeridership

The evaluation team calculated the mean of the overall *intention* and the overall *influence* of freeridership components to estimate final freeridership for the measure categories. A higher freeridership score translates to more savings that are deducted from the gross savings estimates. The

intention, influence, and final freeridership scores by measure category for the Renewable Energy Offering are listed in Table G-39.

Table G-39. Renewable Energy Offering Freeridership Score

Measure Category	n	Intention FR Score	Influence FR Score	Final FR Score
Solar PV, Residential	70	75% ^a	41% ^a	58%
Solar PV, Commercial	38	56% ^a	20% ^a	38%

^a Weighted by verified lifecycle MMBtu gross energy savings.

Participant Spillover Analysis

The evaluation team estimated participant spillover based on answers from respondents who purchased additional high-efficiency equipment or appliances following their participation in the Renewable Energy offering. No residential respondents reported attributable spillover activity, so spillover is 0% for residential solar PV measures. The team applied evaluated savings to commercial LED spillover measures that a commercial customer reported installing as a result of participation in the offering, as shown in Table G-40.

Table G-40. Renewable Energy Offering Participant Spillover Measures and Savings – Commercial

Measure Category	Spillover Measure	Quantity	Total MMBtu Lifecycle Gross Savings Estimate
Solar PV, Commercial	Outdoor LEDs	10	448.36

Next, the team divided the commercial sample spillover savings by the offering measure category gross savings from the entire commercial survey sample, as shown in this equation:

$$Spillover \% = \frac{\sum \text{Spillover Measure Energy Savings for All Survey Respondents}}{\sum \text{Program Measure Energy Savings for All Survey Respondents}}$$

This yielded a 0% spillover estimate for the commercial solar PV measure category, when rounded to the nearest whole percentage, for the Renewable Energy offering’s commercial respondents (Table G-41).

Table G-41. Renewable Energy Offering Participant Spillover Percentage Estimate – Commercial

Variable	Total MMBtu Lifecycle Savings Estimate
Spillover Savings	448
Offering Savings	225,433
Spillover Estimate	0%

Final Net-to-Gross Analysis

The evaluation team combined the spillover information with the freeridership results to achieve the NTG ratios, using the following calculation, as shown in Table G-42:

$$\text{NTG} = 1 - \text{Freeridership} + \text{Spillover}$$

Table G-42. Renewable Energy Offering NTG Estimates

Measure Category	n	Freeridership	Spillover	NTG
Solar PV, Residential	70	58% ^a	0%	42%
Solar PV, Commercial	38	38% ^a	0%	62%

^a Weighted by verified lifecycle MMBtu gross energy savings.

General Population Nonparticipant Spillover Findings

Effective program marketing and outreach generates program participation and increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program marketing can affect customers’ perceptions of their energy usage and, in some cases, motivate customers to take efficiency actions outside of Focus on Energy offerings. This is generally called nonparticipant spillover (NPSO)—that is, the energy savings caused by, but not rebated through, Focus on Energy’s energy efficiency and renewable resource offerings.

To understand whether Focus on Energy’s general and specific marketing efforts generated energy efficiency improvements outside of its incentives and offerings, the evaluation team collected spillover data through the general population surveys conducted with randomly selected residential and nonresidential customers.

Residential Nonparticipant Spillover Methodology

Large utilities across the state provided the evaluation team with either samples or full lists of their residential customers and the evaluation team developed a random sample for a general population survey (see *Appendix M* in Volume III). Using this sample, the team conducted a survey with 654 customers. The team also cross-checked respondents’ information across all CY 2021 program tracking data, removing any from NPSO consideration if the records indicated they had participated in a Focus on Energy offering in CY 2021. When estimating NPSO, evaluation team excluded these customers from analysis, focusing on identified nonparticipants; thus the analysis avoided potential double-counting of offering savings and/or offering-specific spillover.

The evaluation team limited the NPSO analysis to the same types of efficiency measures rebated through Focus on Energy offerings (known as like spillover). Examples included installing a high-efficiency furnace and installing high-efficiency insulation for which participants (for whatever reason) did not apply for and receive an incentive. The team did exclude one notable category of like measures: lighting products. This precluded potentially double-counting NPSO lighting savings already captured through the upstream lighting incentives because no customer information is collected for the Retail Lighting Offering.

Using a 1 to 5 scale, with 1 meaning *not at all important* and 5 meaning *very important*, the survey asked customers to rate the importance of several factors on their decisions to install energy-efficient equipment without receiving an incentive from Focus on Energy. This question determined whether Focus on Energy’s energy efficiency initiatives motivated energy-efficient purchases.

The evaluation team estimated NPSO savings from respondents who rated Focus on Energy as *very important* for any energy-efficient actions or installations reported.

The evaluation team leveraged measure-level estimated gross savings from the CY 2021 Focus on Energy residential evaluation activities for the reported NPSO measures. Using the variables shown in Table G-43, team determined total residential NPSO generated by Focus on Energy’s marketing and outreach efforts during the CY 2021 evaluation year.

Table G-43. Residential NPSO Analysis Method

Variable	Metric	Source
A	Total lifecycle gross spillover savings MMBtu from survey respondents	Survey data/engineering estimates
B	Total nonparticipant customers surveyed	Survey disposition minus matched CY 2021 participants
C	Average lifecycle MMBtu savings per nonparticipant surveyed	A ÷ B
D	Total residential customer nonparticipant population housing units	2019 U.S. Census minus Focus on Energy participant population
E	NPSO MMBtu savings applied to population	C × D
F	Total evaluated lifecycle gross program savings	CY 2021 Focus on Energy evaluation
G	NPSO as a percentage of total CY 2021 residential portfolio evaluated lifecycle gross MMBtu savings	E ÷ F

Residential Results

Table G-44 shows the survey attrition of the residential general population survey results to arrive at five nonparticipant customers who reported installing energy-efficient measures in their home in CY 2021 where Focus on Energy was *very important* in their purchasing decision.

Table G-44. CY 2021 Residential General Population Survey Attrition for NPSO Consideration

Removal Reason	Respondents
Original Contacted	654
Participated in CY 2021 Focus on Energy program	-1
Was not aware of Focus on Energy at time of interview	-133
No energy efficient equipment installed in past year	-457
Did not rate Focus on Energy as <i>very important</i> in purchasing decision of program eligible measure	-58
Rated Focus on Energy as <i>very important</i> in purchasing decision of program eligible measure	5
Customers with NPSO activity being attributed to Focus on Energy for CY 2021	5

Table G-45 presents measures and gross evaluated kilowatt-hour savings evaluation team attributed to Focus on Energy, generating total lifecycle gross savings of 121.39 MMBtu for the NPSO measures.

Table G-45. Residential NPSO Response Summary

Reported Spillover Measures	Mentions by Respondents	Unit Energy Savings (Lifecycle MMBtu) ^a	Total Savings (Lifecycle MMBtu)
Air Sealing	2 ^b	0.05 per unit	8.29
High Efficiency Furnace	2	39.99 per unit	79.99
High Efficiency Insulation	1 ^c	1.78 per unit	33.11
Total	5		121.39

^a Unit energy savings estimated for each measure were generated from average CY 2021 Focus on Energy evaluated gross savings.

^b Two respondents associated with 170 linear feet of air sealing.

^c One respondent associated with 120 square feet of insulation.

Table G-46 presents variables used to estimate overall NPSO for the Focus on Energy residential portfolio, which the team estimated as 2.8% of total CY 2021 Focus on Energy evaluated lifecycle savings.

Table G-46. CY 2021 Residential NPSO Analysis Results

Variable	Metric	Value	Source
A	Total lifecycle gross spillover savings MMBtu from survey respondents	120.39	Survey data / Engineering Estimates
B	Total nonparticipant customers surveyed	653	Survey disposition minus matched CY 2021 participants
C	Average lifecycle MMBtu savings per nonparticipant surveyed	0.186	A ÷ B
D	Total residential customer nonparticipant population housing units	2,419,691	2019 U.S. Census minus Focus on Energy Participant Population
E	NPSO MMBtu savings applied to population	449,797,49	C × D
F	Total evaluated lifecycle gross program savings	16,119,330	CY 2021 Focus on Energy Evaluation
G	NPSO as a percentage of total CY 2021 residential portfolio evaluated lifecycle gross MMBtu savings	2.8%	E ÷ F

Nonparticipant Spillover Methodology

The evaluation team randomly selected and surveyed 101 customers from a sample of randomly selected nonresidential accounts. None of the 101 customers surveyed matched participating customer information in the CY 2021 program tracking data.

Using a 1 to 5 scale, with 1 meaning *not important* and 5 meaning *very important*, the survey asked customers to rate the importance of several factors on their decisions to install energy-efficient equipment without receiving an incentive from Focus on Energy. This question determined whether Focus on Energy’s energy efficiency initiatives motivated energy-efficient purchases. The surveys asked respondents to address the following factors:

- Information about energy savings from Focus on Energy representative
- Past participation in a Focus on Energy business incentive offering over a year ago

Measures were eligible for NPSO savings estimation by the evaluation team if respondents rated any of the above factors as *very important* for any energy-efficient actions or installations reported.

No nonparticipant customers reported installing energy-efficient measures in CY 2021, where a Focus on Energy-related factor was *very important* in their purchasing decision. The evaluation team estimated an NPSO of 0.0% for the nonresidential portfolio.

Spillover Results

Table G-47 shows the survey attrition of the nonresidential general population survey results to arrive at no nonparticipant customers reported having installed energy-efficient measures in CY 2021, where a Focus on Energy-related factor was *very important* in their purchasing decision. As a result, the evaluation team estimated an NPSO of 0.0% for the CY 2021 nonresidential portfolio.

Table G-47. CY 2021 Nonresidential General Population Survey Attrition for NPSO Consideration

Removal Reason	Respondents
Original Contacted	101
Participated in CY 2021 Focus on Energy program	0
Was not aware of Focus on Energy at time of interview	-46
No energy- efficient equipment installed in past year	-40
Did not rate Focus on Energy as <i>very important</i> in purchasing decision of program-eligible measure	-15
Rated Focus on Energy as <i>very Important</i> in purchasing decision of program-eligible measure	0
Customers with NPSO activity being attributed to Focus on Energy for CY 2021	0

Appendix H. Summary of Confidence and Precision

Focus on Energy gives serious consideration to evaluation design to ensure that its offerings achieve the most accurate and reliable results possible under the available evaluation budget. The evaluation uses statistical confidence and precision standards as a key driver in determining the scale and scope of the evaluation design for each offering for which the net savings target is 90% confidence and ±10% precision over the CY 2019-CY 2022 quadrennium.

The evaluation team calculated the precision of final net first-year and lifetime energy savings estimates (MMBtu) at 90% confidence for each offering in the Focus on Energy portfolio. The precision reflects the uncertainty in the savings estimates due to measurement error, regression error, and sampling error. Measurement error refers to the uncertainty around engineering parameters derived from simulation or professional judgment, regression error refers to uncertainty around estimates derived from regression analysis, and sampling error refers to uncertainty introduced by estimating population parameters based on a sample.

After calculating standard errors, the evaluation team calculated the precision of the final estimates using the following formula:

$$\text{relative precision} = \frac{\text{z-statistic} * SE}{\text{total net savings}}$$

Where:

- z-statistic = Critical value at a specific confidence level
- SE = Standard error of the total net savings estimate
- total net savings = Total net savings estimated based on the evaluation results

This appendix provides details on how the evaluation team calculated total net savings estimates and their standard errors.

Introduction to Statistical Uncertainty

The evaluation team collected data from surveys, billing histories, meters, and secondary sources including the TRM to estimate net savings for each offering and the portfolio. Statistical uncertainty is inherent in all activities for which samples or models are used to estimate a property of a population. Using sampled data is often preferred to save on the costs and time associated with studying an entire population and because random samples of the population provide sufficiently reliable results. The strength of an estimate is related to the amount of uncertainty or error around it, which is determined based on the statistical properties of sampled data and how they are used to make inferences about a population.

Statistical uncertainty comprises two parts: the confidence and the precision of the estimate. Confidence intervals show the range of values within which one expects the unknown population parameter to fall. Confidence refers to the probability that the true value of the metric of interest (such as kilowatt-hours saved) will fall within some level of precision.

A statement of precision without a statement of confidence is misleading. For example, if energy savings is estimated as 24 kWh with precision of ±5 kWh at 90% confidence, the interpretation is that one is 90% confident that the true energy savings is between 19 kWh and 29 kWh. Narrower confidence intervals indicate that the savings estimate is very precise, and wider confidence intervals indicate that the variability in the data is large and that more information would be required to produce a more precise estimate.

For the Focus on Energy evaluation, the general standard for uncertainty is to achieve evaluation results with 90% confidence and ±10% precision over the CY 2019-CY 2022 quadrennium. Evaluation activities are defined and prioritized to align with this standard. This standard is in line with nationwide best practices for the evaluation of energy efficiency programs, as documented in the U.S. Environmental Protection Agency’s National Action Plan for Energy Efficiency and elsewhere.²⁷

Combining Net Uncertainty with Gross Uncertainty

When two estimates are based on different evaluation activities and combined to produce a final estimate, the uncertainty from each estimate must be considered in calculating the uncertainty of the final estimate. For example, if one set of data collected from surveys, billing analyses, metering, and/or TRM review is used to estimate gross savings and another set of data collected from a separate survey is used to estimate spillover, freeridership, and NTG ratios and then that NTG ratio is applied to the gross savings to estimate net savings, the standard error of total net savings should be based on the standard error of gross savings and the NTG ratio. Details are provided below, specific to each set of offerings.

When the evaluation team estimates NTG ratios using survey data collected from an independent simple random sample of participants, it uses a ratio estimator and its standard error formula to quantify the uncertainty in the NTG ratios where net savings are represented by y_i , *ex post* savings are represented by x_i , and the standard error of the NTG ratio estimate is represented by SE_{NTG} , in the following formulas:

$$NTG\ Ratio = \frac{\sum_{sample} y_i}{\sum_{sample} x_i}$$

$$SE_{NTG} = \sqrt{\sum_{i=1}^n \frac{(y_i - NTG\ Ratio * x_i)^2}{\bar{x}^2 * n(n - 1)}}$$

²⁷ U.S. Environmental Protection Agency. Accessed April 2021. “Energy and the Environment. National Action Plan for Energy Efficiency.” <https://www.epa.gov/energy/national-action-plan-energy-efficiency>

The evaluation team then multiplies the NTG ratio to the total *ex post* gross savings to estimate total net savings and uses the formula for the standard error of the product of two independent random variables to calculate precision, as shown in this formula:

$$SE_{total\ net\ savings} = \sqrt{\frac{NTG^2 * SE_{total\ ex\ post\ gross\ savings}^2 + total\ ex\ post\ gross\ savings^2 * SE_{NTG}^2}{SE_{NTG}^2 + SE_{NTG}^2 * SE_{total\ ex\ post\ gross\ savings}^2}}$$

The evaluation team used this method for all offerings unless otherwise noted.

Nonresidential Offerings

The evaluation team selected a sample of projects in each nonresidential offering to estimate *ex post* verified gross savings. It used a stratified sample design with a random stratum and a census stratum in most offerings. Sampling took place throughout the evaluation year in three waves. The evaluation team placed projects whose savings were above a percentage threshold of total offering savings in the census stratum. The sample design was successful in achieving low precision values for all offerings, as seen in the CY 2021 precision results.

The evaluation team applied the realization rates to the population total *ex ante* savings in each offering by wave to estimate that wave’s population total *ex post* gross savings. It calculated realization rates and standard errors in the random stratum in each wave using the formulas presented in the UMP sampling chapter.²⁸

In the following formulas, y_i represents *ex post* savings for each evaluated measure, x_i represents *ex ante* savings for each measure, and n represents each wave’s sample size.

$$RR_{random\ stratum} = \frac{\sum_{sample} y_i}{\sum_{sample} x_i}$$

$$random\ stratum\ ex\ post\ gross\ savings = RR_{random\ stratum} * \sum_{random\ stratum\ population} x_i$$

$$SE_{random\ stratum\ total\ ex\ post\ gross\ savings} = \frac{\sum_{random\ stratum\ population} x_i}{\sqrt{n} * \bar{x}_i} * \sqrt{\frac{\sum_{i=1}^n (y_i - RR * x_i)^2}{n - 1}}$$

The team also calculated realization rates for the census stratum in each offering. In the census stratum, all projects are evaluated in order to directly verify the largest saving projects. The census stratum has no sampling error. To estimate a single standard for each wave’s combined census and random strata, the evaluation team used the following formula.

²⁸ National Renewable Energy Laboratory. April 2013. *The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures*. “Chapter 11: Sample Design Cross-Cutting Protocols.” Prepared by Cadmus. <http://energy.gov/sites/prod/files/2013/11/f5/53827-11.pdf>

$$SE_{wave \text{ total ex post gross savings}} = \sqrt{(SE_{random \text{ stratum total ex post gross savings}})^2 + (SE_{census \text{ stratum total ex post gross savings}})^2}$$

As the standard error of the census stratum is zero, the standard error for the wave simplifies to the following:

$$SE_{wave \text{ total ex post gross savings}} = SE_{random \text{ stratum total ex post gross savings}}$$

The following formulas show the realization rate calculations for the census stratum and the method for calculating a single realization rate for the wave. The team used similar methods to combine census and random stratum standard errors and realization rate within waves and across waves.

$$RR_{census \text{ stratum}} = \frac{\sum_{census} y_i}{\sum_{census} x_i}$$

$$census \text{ stratum ex post gross savings} = RR_{census \text{ stratum}} * \sum_{census \text{ stratum population}} x_i$$

$$RR_{wave} = \frac{random \text{ stratum ex post gross savings} + census \text{ stratum ex post gross savings}}{\sum_{wave} x_i}$$

The team estimated nonresidential NTG ratios using survey data collected from an independent simple random sample of participants then multiplied these ratios with the total *ex post* gross savings to estimate total net savings for each offering. The team used a ratio estimator and standard error formula described above to quantify the uncertainty in the NTG ratios.

Table H-1 presents the precision of total net first and cumulative year MMBtu savings estimates at 90% confidence for each nonresidential offering by program year. The sources of uncertainty in all nonresidential savings estimates were due to estimating the realization rate and NTG values based on samples.

Table H-1. Nonresidential Net First-Year MMBtu Energy Savings Precision

Nonresidential Offerings	Precision at 90% Confidence			
	CY 2020	CY 2021	CY 2022	Cumulative ^a
Agribusiness	13%	9%	TBD	8%
Commercial and Industrial	17%	17%	TBD	9%
Schools	12%	12%	TBD	9%
Large Industrial	12%	12%	TBD	9%
Government	12%	12%	TBD	9%
New Construction: Design	25%	25%	TBD	18%
New Construction: Prescriptive	19%	19%	TBD	14%
Renewable Energy Competitive Incentive	9%	9%	TBD	8%
Renewable Rewards	13%	22%	TBD	9%

^a Between CY 2019 and CY 2020, the nonresidential programs were reorganized. CY 2019 precision was calculated at the program level, which does not align with the offerings in CY 2020 and 2021; therefore, cumulative precision does not include CY 2019.

Residential Offerings

The evaluation team used various methods to evaluate the residential offerings. Table H-2 presents the precision of total net savings estimates and the sources of uncertainty for each residential offering, by program year as well as cumulative.

Table H-2. Residential Net First-Year MMBtu Energy Savings Precision (90% Confidence)

Residential Offerings	Precision at 90% Confidence					Sources of Uncertainty
	CY 2019	CY 2020	CY 2021	CY 2022	Cumulative	
Appliance Recycling ^a	38%	32%	N/A	N/A	19%	UEC model, part use, and NTG ratio
Trade Ally Solutions ^b	2%	3%	3%	TBD	2%	PRISM model, NTG ratio
New Construction	122% ^c	8%	8%	TBD	41%	PRISM model
Retail	53%	13%	15%	TBD	19%	ISR and NTG ratio
Packs	2%	3%	3%	TBD	1%	Survey estimated ISRs and NTG ratios
Online Marketplace	10%	3%	3%	TBD	2%	ISR and NTG ratio

^a The Appliance Recycling offering was discontinued after CY 2020.

^b Whole-home and HVAC measures did not map to current offerings in Trade Ally Solutions. To calculate cumulative precision across years, precision was rolled up across offerings.

^c High relative precision around first-year MMBtu savings in the New Construction offering resulted from a small savings estimate (0.004 therms/sq ft).

Appendix I. Cost-Effectiveness and Emissions Methodology and Analysis

When developing potential offerings, APTIM, the Focus on Energy administrator, assesses the cost-effectiveness of offering designs prior to their implementation. The administrator, in collaboration with the PSC and the evaluation team, developed a cost-effectiveness calculator tool. Because maintaining consistency between planning and evaluation approaches is critical to understanding offering performance compared with expectations, the evaluation team used the same calculator to evaluate cost-effectiveness in CY 2021. Its findings are presented in this appendix.

The PSC considers the Modified TRC test to be the primary test in assessing the cost-effectiveness of both individual offerings and the entire Focus on Energy portfolio.²⁹ The PSC also directs that four additional tests be conducted for advisory purposes. These are an expanded TRC test that also includes net economic benefits, the utility administrator cost test (UAT), the ratepayer impact measure (RIM) test, and the societal test. Beginning with the CY 2020 evaluation, the PSC has approved the inclusion of the avoided costs associated with reduced needs for T&D infrastructure.³⁰

NTG ratios can be a significant driver in the results of the tests. NTG ratios are applied to adjust the energy savings impacts of the offerings so they reflect only the net gains that result. Therefore, NTG ratios correct for energy savings that would have been achieved without the efficiency offerings as well as participant spillover (that is, when NTG is less than 1, savings are removed; when NTG is greater than 1, savings are added). In all cases, the savings are multiplied by NTG.

On the cost side, expenditures that would have occurred without the efficiency effort are also removed. Costs that would not have occurred in the absence of the offerings—such as delivery and administrative costs—are not impacted by NTG.

²⁹ The use of the Modified TRC test as the primary cost-effectiveness test is directed by the PSC. Public Service Commission of Wisconsin. September 3, 2014. *Quadrennial Planning Process II – Scope*. Order PSC Docket 5-FE-100, REF#: 215245. Order was updated on June 6, 2018. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 343509. http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909.

³⁰ The calculation method and inclusion of avoided transmission and distribution costs is directed by the PSC. Public Service Commission of Wisconsin. March 10, 2021. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 406591. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=406591>.

Test Descriptions

The evaluation team—as well as the administrator in developing its cost-effectiveness calculator—uses methods adapted from the California Standard Practice Manual, the conventional standard of cost-effectiveness analysis for energy efficiency programs in the United States.³¹ The five tests—the modified TRC test, the expanded TRC test, the UAT, the RIM test, and the societal test—are described in this section.

Modified Total Resource Cost Test

The TRC test is the most commonly applied test for evaluating the cost-effectiveness of energy efficiency and renewable resource programs around the country. Applications range across states and utility jurisdictions, from the standard TRC test to the societal test, which expands the test inputs to account for a more holistic societal perspective. The test includes total participant and administrator costs and also some non-energy benefits (such as emission reduction benefits). Modifications to the standard TRC test often involve reducing the discount rate or including various environmental and additional non-energy benefits.

The Modified TRC test used for the CY 2021 evaluation determines if the offerings are cost-effective from a regulatory perspective (as directed by the PSC) and is intended to measure the overall impacts of the benefits and costs of these offerings on the state of Wisconsin. The test compares all benefits and costs that can be measured with a high degree of confidence, including any net avoided emissions that are regulated and that have either well-defined market or commission-established values. The test’s purpose here is to determine if the total costs incurred by residents, businesses, and Focus on Energy for operating the offerings are outweighed by the total benefits they receive.

In simple terms, the benefit/cost value of the Modified TRC test is the ratio of avoided utility and environmental costs from avoided energy consumption to the combination of administrative costs, delivery costs, and net participant incremental measure costs.

The benefit/cost equation used for the Modified TRC test follows:

$$TRC \frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy + Value\ of\ Gross\ Avoided\ Emissions] * NTG}{[Administrative\ Costs + Delivery\ Costs + (Incremental\ Measure\ Cost * NTG)]}$$

Where:

$$Value\ of\ Gross\ Saved\ Energy = Net\ Gross\ Savings \times Utility\ Avoided\ Costs$$

³¹ California Public Utilities Commission. July 2002. *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. http://www.calmac.org/events/SPM_9_20_02.pdf

Expanded Total Resource Cost Test with Net Economic Benefits

The evaluation team investigated the impact of expanding the TRC to include net economic benefits for the CY 2021 offerings. The analysis of economic benefits is conducted every two years, and the evaluation team issues the results separately from the evaluation reports.

This is the benefit/cost equation used for the expanded TRC test with net economic benefits:

$$TRC \frac{B}{C} = \frac{[(Value\ of\ Gross\ Saved\ Energy + Value\ of\ Gross\ Avoided\ Emissions) * NTG + Net\ Economic\ Benefits]}{[Administrative\ Costs + Delivery\ Costs + (Incremental\ Measure\ Cost * NTG)]}$$

Utility Administrator/Offering Administrator Cost Test

The evaluation team also assessed the portfolio’s cost-effectiveness using the UAT, which measures the net benefits and costs of the offerings as a resource option from the perspective of the Focus on Energy offering administrator. In Wisconsin, the UAT effectively represents the collective perspectives of the participating utilities that hire and fund the administrator.

The UAT, previously called the revenue requirements test, effectively estimates the impacts on utility revenue requirements (the costs of providing service) by comparing the benefits of avoided utility costs from avoided energy consumption to the combined costs of operating the offering, such as incentive payments, administrative costs, and delivery costs. A positive benefit/cost ratio, therefore, indicates that the offering improves an energy system’s overall efficiency.

For this evaluation, the UAT’s benefit/cost value indicates whether the combined revenue requirements from all participating utilities increase or decrease as a result of the Focus on Energy offerings. The net benefits determined with the UAT indicate the estimated dollar value of the change in the combined revenue requirements from all participating utilities. The NTG ratio impacts only the benefit side of the UAT because none of the costs would have occurred absent the effort and, therefore, all are kept in the test (not subtracted from the denominator).

The benefit/cost equation used for the UAT follows:

$$UAT \frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy * NTG]}{[Participant\ Incentives + Administrative\ Costs + Delivery\ Costs]}$$

Ratepayer Impact Measure Test

Generally, the RIM test indicates the isolated and marginal effect on utility energy rates from changes in revenues and operating costs caused by energy efficiency and renewable resource programs, all else being equal. It does not, however, provide a comprehensive picture of ratepayer impacts. The RIM test’s estimated effects are theoretical and assume annual rate cases that may, in fact, not take place.

Furthermore, the RIM test does not account for non-energy benefits enjoyed by ratepayers, nor does it clearly distinguish the difference between rate and total bill impacts.

From the RIM test perspective, the relatively expansive view of program costs, particularly the inclusion of lost revenues—which are foregone revenues as opposed to new costs—from avoided energy consumption, leads most energy efficiency and renewable energy programs to not be cost-effective.

Exceptions include demand response programs or programs targeted to the highest marginal cost hours (when marginal costs are greater than rates). In simple terms, the RIM test benefit/cost value is the ratio of avoided utility costs and the combination of participant incentives, administrative costs, and lost utility revenue.

The benefit/cost equation used for the RIM test follows:

$$RIM \frac{B}{C} = \frac{[Value\ of\ Gross\ Saved\ Energy * NTG]}{[Participant\ Incentives + Administrative\ Costs + Lost\ Revenue * NTG]}$$

For this evaluation, a RIM test benefit/cost value less than 1 indicates that Focus on Energy will induce theoretical upward pressure on rates because the decrease in utility revenues caused by its offerings is greater than the avoided utility costs (net benefits are negative) and *vice versa*. Conversely, a value greater than 1 indicates that Focus on Energy will induce theoretical downward pressure on rates because the decrease in revenues is less than the avoided utility costs.

Results from the RIM test are better understood within the context of UAT results. The most common combination of results involves a UAT benefit/cost value greater than 1 and a RIM test benefit/cost value less than 1. Passing the UAT means that revenue requirements (revenue needed to operate the utility business and deliver energy services) will decrease as a result of the programs; in other words, the utilities are running more efficiently because of their programs.

However, if the programs do not pass the RIM test, it means the improvement in efficiency and the associated decrease in revenue requirements were not sufficient to offset the lost revenues. As a result, the programs will put upward pressure on rates. Rates are roughly estimated as in this formula:

$$\frac{revenue\ requirement}{sales\ (kWh\ or\ therms)}$$

The numerator (revenue requirement) decreases, but so does the denominator (sales). If the denominator decreases more than the numerator, the ratio of the two will increase. In this scenario, although all *rates* may theoretically increase, the energy *bills* for participants will decrease and the energy *bills* for nonparticipants will increase. The decrease in revenue requirement means that the decrease in participant bills will exceed the increase in nonparticipant bills such that the average bills across the two customer groups will decrease.

In essence, the RIM test is not a cost-effectiveness (efficiency) test in an economic sense but, rather, an analysis of the distributional (equity) impacts on energy bills.³² Because Focus on Energy offerings are designed to meet a statutory requirement to make offering benefits available to all ratepayers, the RIM test results for Focus on Energy are influenced by the success of its offerings in meeting that requirement,

³² The RIM test assumes annual rate cases that may not take place. If there is not an annual rate adjustment, there is a transfer payment to participants from utility shareholders rather than from nonparticipants.

its ability to meet that requirement within existing resources, and its customers’ individual willingness to participate.

The RIM test assumes that a true-up will occur every year through rate cases. The test as applied could be considered the worst-case scenario. The RIM test also does not consider any societal or system benefits that accrue to *all* customers.

Societal Test

In addition to the expanded TRC, the evaluation team investigated the impact of several non-energy benefits such as health, water, purchase deferral, property value, and arrearage benefits that are included in the CY 2021 offerings.

The benefit/cost equation used for the societal test is the following:

$$SOC \frac{B}{C} = \frac{[(Value\ of\ Gross\ Saved\ Energy + Value\ of\ Gross\ Avoided\ Emissions) * NTG + Net\ Economic\ Benefits + NEBs]}{[Administrative\ Costs + Delivery\ Costs + (Incremental\ Measure\ Cost * NTG)]}$$

A more detailed discussion of the various non-energy benefits in the societal test are presented below.

Non-Energy Benefits

Summary

Table I-1 summarizes the non-energy benefits from the five metrics that have been quantified in this analysis. The five metrics are health benefits, water benefits, purchase deferral benefits, property value benefits, and income-qualified arrearage benefits.

Table I-1. Non-Energy Benefits Results Summary

Benefit	Value	Unit
Health Benefit	\$0.0311	per kWh
Water Benefits - Residential	\$0.0067	per gallon
Water Benefits - Commercial	\$0.00718	per gallon
Purchase Deferral	Measure specific	Measure specific
Property Values	\$8,650	per home
Arrearages	\$23.25	per participant

Health Benefits

The evaluation team estimated the value of health benefits accumulated by reduced emissions attributable to offering activity. The team followed the method recommended by the U.S. Environmental Protection Agency (EPA) using the benefits per kilowatt-hour (BPK) tool. The BPK tool was introduced in late fall 2019, using data from 2017, to help interested parties estimate health benefits from reduced emissions. It was updated in spring 2021, using data from 2019.

The BPK tool relies on the AVoided Emissions and geneRration Tool (AVERT) regional inputs, which specify the blend of electric generation sources (coal, natural gas, hydroelectric, other renewables, etc.)

and the downstream effects of particulate generation from those sources as determined in the Co-Benefits Risk Assessment (COBRA) health impacts screening and mapping tool.

BPK values are determined using the following equation:

$$BPK_{t,r} = \frac{HealthBenefits_{t,US}}{GenerationChange_{t,r}}$$

Where:

- BPK_{t,r} = Annual monetized public health benefits per kilowatt-hour (c/kWh) for each energy efficiency/renewable energy technology type (t) and AVERT region (r)
- Health Benefits_{t,US} = Aggregated monetized public health benefits from emissions reductions for each type of energy efficiency/renewable energy technology (t) for the contiguous United States (US) in 2019 dollars
- Generation Change_{t,r} = Change in electricity generation for each energy efficiency/renewable energy technology type (t) and AVERT region (r)

The effects of these emissions are then tied to the negative health outcomes associated with inhalation of those particulates. Table I-2 lists these included health inputs, along with the savings associated with each input. The in-depth methodology for the calculation of these benefits is available in a 2021 report on public health and energy from the EPA.³³

³³ U.S. Environmental Protection Agency. May 2021. *Public Health Benefits per kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report*. https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf

Table I-2. Included Health Inputs

Health Endpoint	Age Range
Mortality ^a	25–99
Infant Mortality ^b	0–0
Acute Myocardial Infarction, Nonfatal ^c	0–24
Acute Myocardial Infarction, Nonfatal ^c	25–44
Acute Myocardial Infarction, Nonfatal ^c	45–54
Acute Myocardial Infarction, Nonfatal ^c	55–64
Acute Myocardial Infarction, Nonfatal ^c	65–99
Acute Myocardial Infarction, Nonfatal ^d	0–24
Acute Myocardial Infarction, Nonfatal ^d	25–44
Acute Myocardial Infarction, Nonfatal ^d	45–54
Acute Myocardial Infarction, Nonfatal ^d	55–64
Acute Myocardial Infarction, Nonfatal ^d	65–99
Hospital Admissions, All Cardiovascular (less-acute myocardial infarction)	18–64
Hospital Admissions, All Cardiovascular (less-acute myocardial infarction)	65–99
Hospital Admissions, All Respiratory	65–99
Hospital Admissions, Asthma	0–17
Hospital Admissions, Chronic Lung Disease	18–64
Asthma Emergency Room Visits (Smith et al. 1997)	0–99
Asthma Emergency Room Visits (Stanford et al. 1999)	0–99
Acute Bronchitis	8–12
Lower Respiratory Symptoms	7–14
Upper Respiratory Symptoms	9–11
Minor Restricted Activity Days	18–64
Work Loss Days	18–64
Asthma Exacerbation (cough, shortness of breath, or wheeze)	6–18

^a Mortality value after adjustment for 20-year lag.

^b Infant mortality value is not adjusted for 20-year lag.

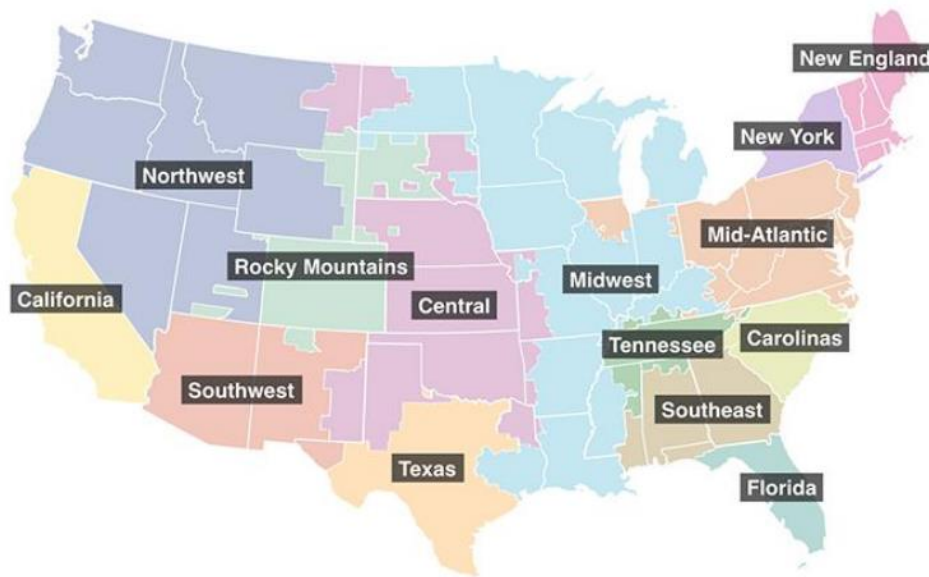
^c Based on Russell (1998).

^d Based on Wittels (1990).

Source: U.S. Environmental Protection Agency

To determine Wisconsin-specific values, the evaluation team used the cost of emissions generated across the AVERT region that covers the state (Midwest, as shown in Figure I-1). The team assumed a 2% discount rate to comply with decisions by the PSC for Quadrennial Planning Process III, the current Focus on Energy period.

Figure I-1. U.S. EPA AVERT Regions



Source: U.S. Environmental Protection Agency.

The two inputs specific to Wisconsin health benefits are a low estimate value of 3.11 cents per kWh and a high estimate value of 7.01 cents per kWh, as presented in Table I-3. The evaluation team determined that the lower of the two value ranges was the most appropriate to use because it provides the most conservative estimate of offering-induced health benefits.

Table I-3. Wisconsin Specific Health Benefits

Region	Technology	Cents/kWh (Low Estimate)	Cents/kWh (High Estimate)
Upper Midwest	Uniform energy efficiency	3.11	7.01

Aggregated health benefits are subsequently generated by applying the 3.11 cents per kWh to the first five years of lifecycle program savings, a shorter period than is claimed for lifetime emissions benefits. This is in line with EPA recommendations not to extend savings beyond the five-year threshold because of the uncertainty in the share of generation each region is expected to draw from various fuel sources during that period and for the likelihood of revisions to health savings assumptions as the tool is regularly updated.

For example, coal generation is expected to start being supplanted by natural gas and renewable sources, which are less polluting than coal and which may substantially reduce the risk of certain specific negative healthcare outcomes while leaving others unaffected.

Water Benefits

The evaluation team estimated participant water delivery and wastewater bill savings attributed to reductions in volumetric water consumption accrued over the lifetime of efficient measures installed. These benefits are estimated for each offering by the following equation:

$$\sum_{Measure=1}^n Units_{Measure} \times PV(Water Savings Per Unit_{Measure} \times Marginal Cost of Water, EUL_{Measure})$$

Where *PV* indicates a present value function that takes annual bill savings and number of periods as inputs and *n* indicates the count of unique measures installed within a particular offering.

The marginal cost of water is then shown in this equation:

$$Marginal Cost of Water = (Marginal Cost of Water Delivery + Marginal Cost of Wastewater Service).$$

The evaluation team acquired input data from various sources:

- Measure quantity ($Units_{Measure}$) data were provided directly by Focus on Energy on an offering-by-offering basis.
- Volumetric water savings attributed to the efficient measure relative to some baseline measure ($Water Savings Per Unit_{Measure}$) was acquired from the Wisconsin TRM. The evaluation team scaled the savings data by the NTG ratio for each offering.
- The water delivery rate ($Marginal Cost of Water Delivery$) was estimated using a weighted averaging algorithm from a sample of 25 water utilities in Wisconsin. This sample includes the 10 largest water utilities in Wisconsin, a random sample of 10 utilities from the smallest 50% of utilities in Wisconsin, and a random sample of five additional utilities in Wisconsin, where size is measured by average number of customers served.³⁴
- From these 25 utilities, the evaluation team calculated average marginal (volumetric) delivery rates for each utility for both residential and commercial sectors by taking the arithmetic mean of the highest and lowest rate tiers charged by each utility.³⁵ The team then calculated overall rate estimates by taking weighted averages of these utility-specific averages for both residential and commercial sectors, where each utility's weight is proportional to the utility's average number of customers relative to the sum of each utility's average number of customers for all utilities included in the sample. The final water delivery rate estimates for Wisconsin are \$2.65 and \$2.26 per 100 cubic feet for residential and commercial sectors, respectively.

² Utility sales data was acquired from the PSC's E-Services Portal. The evaluation team used 2021 and 2020 water sales data. Public Service Commission of Wisconsin. February 2022. *E-Services Portal: Municipal Annual Report Data*. <https://apps.psc.wi.gov/ARS/WEGSqueries/default.aspx>

³⁵ Utility tariff data were acquired from the Public Service Commission of Wisconsin's E-Services Portal. Public Service Commission of Wisconsin. February 2022. *E-Services Portal: Utility Tariffs*. <https://apps.psc.wi.gov/RATES/tariffs/default.aspx?tab=4>

- Table I-4 summarizes the weighted averaging algorithm applied to residential rates in Wisconsin by showing intermediate calculation outputs.³⁶

Table I-4. Residential Water Rate Algorithm Example

Utility Size Bracket	Rank by Gallons Sold	Utility Name	Average Number of Customers	Weight (Utility Customers/ Customers in Sample)	Highest/ Lowest Tier Rates	Rate Average
Top 10	1	Milwaukee Water Works	164,409	24.7%	\$2.14	\$2.14
	2	Green Bay Water Utility	72,356	10.9%	Low: \$1.89; High: \$2.66	\$2.28
	3	Madison Water Utility	69,573	10.4%	Low: \$2.79; High: \$7.71	\$5.26
	4	Appleton Water Department	56,443	8.5%	Low: \$3.50; High: \$4.55	\$4.02
	5	Eau Claire Municipal Water Utility	55,896	8.4%	\$2.21	\$2.21
	6	Janesville Water Utility	47,870	7.2%	Low: \$2.19; High: \$3.7	\$2.95
	7	West Allis Municipal Water Utility	41,170	6.2%	Low: \$2.08; High: \$2.58	\$2.33
	8	Sheboygan Water Utility	38,323	5.8%	Low: \$1.34; High: \$1.72	\$1.53
	9	Racine Water Works Commission	35,253	5.3%	Low: \$2.41; High: \$3.11	\$2.76
	10	La Crosse Water Utility	33,116	5.0%	Low: \$1.11; High: \$1.59	\$1.35
Random Sample of 10 from Smallest 50%	574	East Troy Sanitary District #3	20	0.0%	\$2.47	\$2.47
	537	Linden Tn Of Sanitary Dist #1	122	0.0%	Low: \$2.19; High: \$3.76	\$2.98
	388	Biron Municipal Water Utility	404	0.1%	Low: \$1.99; High: \$4.52	\$3.26
	285	Village of Oakfield Municipal Water Utility	831	0.1%	Low: \$3.96; High: \$4.88	\$4.88
	376	Redgranite Water Utility	449	0.1%	Low: \$1.35; High: \$1.54	\$1.44
	379	Hilbert Municipal Water Utility	439	0.1%	Low: \$1.56; High: \$2.3	\$1.93
	246	Frederic Water Commission	1,146	0.2%	\$2.57	\$2.57
	534	Genoa Municipal Water And Sewer Utility	125	0.0%	\$1.93	\$1.93

³⁶ Some participants obtain water from sources outside of conventional water delivery from a water utility, such as from natural bodies of water. These participants are not subject to the same marginal cost of delivery charged by water utilities. Because of an inability to reliably identify the source of water saved by program participants, the evaluation team conservatively assumes a water bill savings of \$0 for those larger customers.

Utility Size Bracket	Rank by Gallons Sold	Utility Name	Average Number of Customers	Weight (Utility Customers/ Customers in Sample)	Highest/ Lowest Tier Rates	Rate Average
	261	Black Creek Municipal Water and Sewer Utility	1,014	0.2%	Low: \$1.22; High: \$2.06	\$1.64
	282	Mazomanie Water Utility	844	0.1%	Low: \$1.26; High: \$2.1	\$1.68
Random Sample of Five from Throughout	339	Mercer Sanitary District Number One	576	0.1%	Low: \$2.72; High: \$3.79	\$3.26
	13	Kenosha Water Utility	31,915	4.8%	Low: \$1.76; High: \$2.26	\$2.01
	33	Manitowoc Public Utilities	14,126	2.1%	Low: \$0.95; High: \$1.63	\$1.29
	442	Birnamwood Municipal Water Utility	289	0.0%	Low: \$1.38; High: \$2.13	\$1.76
	556	St Croix Improvements, Inc.	85	0.0%	\$1.50	\$1.50
Final Rate Estimate						\$2.65

- The wastewater service rate (*Marginal Cost of Wastewater Service*) estimate was constructed from a population-weighted average of marginal (volumetric) wastewater charges for 326 (41%) Wisconsin wastewater service territories. The evaluation team acquired population and volumetric charge data from the Wisconsin Sewer User Charge Survey Report.³⁷ The final water wastewater estimate is \$3.11 per 100 cubic feet for both residential and commercial. This estimate accounts for the prevalence of utilities with no volumetric wastewater charge. The team used the same values and method as in 2019 due to a lack of updated data on wastewater service rates for 2020.
- The evaluation team conducted a well water pump analysis to estimate the water delivery rate for the population that uses privately owned wells and pump systems rather than being connected to the municipal system. According to the research, 31% of the Wisconsin population uses privately owned wells.³⁸ By applying a weighted average to the water delivery rates to reflect both water delivery types, the water delivery rate for residential was calculated as \$0.00383 per gallon. The combined delivery and wastewater charges equate to \$0.0067 per gallon for residential usage.
- The commercial sector costs of \$2.26 for delivery and \$3.11 for wastewater per 100 cubic feet of water equates to \$0.00718 per gallon. This Figure does not assume any well water for commercial use.

³⁷ MSA Professional Services, Inc. October 2019. *The Cost of Clean: Wisconsin Sewer User Charge Survey Report*.

³⁸ Wisconsin Department of Natural Resources. *Wisconsin Public Water Systems 2020 Annual Drinking Water Report*. June 2021. <https://dnr.wi.gov/files/pdf/pubs/DG/DG0045.pdf>

- The expected useful life of an efficient measure ($EUL_{Measure}$) was provided by the TRM.
- Lastly, the evaluation team assumed a real annual interest rate of 2%.

Purchase Deferral

Purchase deferral benefits account for the avoided costs of future baseline measure replacement in cases where the useful life of an efficient measure exceeds the useful life of the baseline measure it replaces. The evaluation team estimated purchase deferral benefits for lighting and non-lighting measures.

Lighting

Purchase deferral benefits for lighting measures were estimated on an expected useful life (EUL) basis, where the lifetime of efficient measures (fixtures and lamps) tends to exceed those of their corresponding baseline measures.

The evaluation team assumes that participants of Focus on Energy offerings would have replaced each baseline measure with an identical baseline or equivalent at regular intervals equal to the baseline measure's useful life. Purchase deferral benefits are estimated for each offering by the following generalized expression:

$$\sum_{Measure=1}^n Units_{Measure} \times PV(Avoided\ Replacement\ Costs_{Measure})$$

Where PV indicates a present value function and *Avoided Replacement Costs* refers to the value of avoided baseline measure replacements over the lifetime of the efficient measure.

For each efficient measure installed, the evaluation team attempted to identify a corresponding baseline measure from the Mid-Atlantic TRM because this TRM contains a study of purchase deferral benefits for lighting measures.³⁹ Where available, the evaluation team used the present value of purchase deferral benefits provided explicitly by the Mid-Atlantic TRM.

In cases where the Mid-Atlantic TRM did not provide purchase deferral benefit estimates or the efficient measure installed through a Focus on Energy offering was not an exact match, the evaluation team conducted research to identify the EUL (in life-hours and years) and the cost of the baseline measure indicated in the TRM. These two inputs were used to estimate benefits accrued from each avoided baseline replacement over the lifetime of the efficient measure, reduced by the Focus on Energy discount rate of 2%.

³⁹ Northeast Energy Efficiency Partnerships. October 2019. *Mid-Atlantic Technical Reference Manual, Version 9*. [https://neep.org/sites/default/files/resources/Mid Atlantic TRM V9 Final clean wUpdateSummary%20-%20OCT%20FORMAT.pdf](https://neep.org/sites/default/files/resources/Mid%20Atlantic%20TRM%20V9%20Final%20clean%20wUpdateSummary%20-%20OCT%20FORMAT.pdf)

Non-Lighting

Purchase deferral benefits for non-lighting measures were estimated on an equipment maintenance cost deferral basis. The evaluation team leveraged EUL benchmarking data for the period of July 2020 to June 2021 to prioritize significant non-lighting measures based on the MMBtu saving contribution. For the identified measures, the evaluation team reviewed the Non-Energy Impacts study in the Mass Save TRM.⁴⁰ Benefits arising from equipment maintenance costs were reviewed for available measures.

Based on the aforementioned sources, purchase deferral benefits were estimated for the following non-lighting measures:

- Residential boilers
- Residential furnaces
- Residential thermostats
- Residential/retail ductless mini-split heat pumps

Based on the sourced data, the evaluation team estimated benefits accrued from avoided equipment maintenance cost over the lifetime of the non-lighting measure and applied the Focus on Energy discount rate of 2%.

Finally, the evaluation team scaled the calculated savings by the NTG ratio for each offering.

Property Values

Participating in energy efficiency programs can increase the value of a home and the associated property. Customers who participate in whole-home programs, such as Home Performance with ENERGY STAR, are most likely to see increases in property values.

In 2012, Cadmus completed a study for People Working Cooperatively, a provider of whole-home weatherization for low-income individuals in Cincinnati that researched the impact of low-income whole-home weatherization programs on home value.⁴¹ Through this study, Cadmus found a \$7,000 increase in property value for participants in the People Working Cooperatively program compared with similar homes for nonparticipants. A more recent study done in 2021 by Oak Ridge National Laboratory confirms that a whole-home weatherization project would increase the property value for low-income customers.⁴² Though these studies were specific to low-income customers, Cadmus believes the increase in property value can be applied to all customers who complete a whole-home weatherization project.

⁴⁰ Non-Energy Benefits. *Massachusetts Technical Reference Manual*. May 2020. <https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/12190505>

⁴¹ Cadmus. December 2012. *PWC 2009 Ohio Program Services Evaluation Report*. Prepared for People Working Cooperatively. <https://ia803000.us.archive.org/32/items/695268-cadmus-exec-summary-121312/695268-cadmus-exec-summary-121312.pdf>

⁴² Oak Ridge National Laboratory. March 2021. *Addressing Non-Energy Impacts of Weatherization*. [ORNL SPR-2020-1840.pdf](https://www.ornl.gov/sites/default/files/2021-03/ORNLSR-2020-1840.pdf)

Many factors can impact home value, which makes it difficult to measure this benefit. To adjust for inflation from 2012, the net present value of \$7,000 is calculated as \$8,650 per home. Therefore, for Wisconsin Focus on Energy, the evaluation team used a net present value benefit of \$8,650 per whole-home participant (both Tier 1 and Tier 2) of the Trade Ally Solutions (formerly the Home Performance with ENERGY STAR program).

Arrearages

Outstanding customer debt incurs a cost on the utility and the customer and includes the costs associated with financing (carrying costs, bad debt write-offs) shutoffs, reconnections, sending notices, and collecting debts. Low-income programs provide customers the opportunity to reduce monthly bills, which in turn lowers the probability they will carry debt and, among those who do, helps reduce the overall total.

Several utilities have included the reduced arrearage costs associated with providing low-income program benefits in their societal tests. However, there does not appear to be a universally agreed-upon per-participant value associated with these benefits. Limited primary research is available, and what does exist is not recent. Nevertheless, the evaluation team reviewed two benchmarking analyses from the Skumatz Economic Research Associates, Inc., and Cadmus in 2010 and 2014,^{43,44} which compiled several potential inputs related to the utility benefits associated with low-income programs.

As presented in Table I-5, the study found a typical arrearage-related carrying cost of \$2.50 per participant, with an additional \$1.75 cost associated with the paying of bad debt and \$2.15 in total costs from shutoffs and reconnects, notices, and customer calls/collections. These direct arrearage costs sum to \$6.40. An additional \$13 per customer was also attributed to reduced low-income subsidy payments and discounts if the program was strictly low-income.

Table I-5. Typical Utility Costs Associated with Customer Debt

NEB Estimates from Multiple Weatherization Studies: Dollar and Percentage Analysis	Dollar NEB Values Range Low-High	Typical Value	Percent NEB Values Range Low-High	Typical Value	Notes
UTILITY PERSPECTIVE					
Payment-related					
Carrying cost on arrearages	\$1.50 - \$4.00	\$2.50	0.6% - 4.4%	2.0%	Total arrearages \$2-\$100; \$20-30 typical
Bad Debt Write-offs	\$0.50 - \$3.75	\$1.75	0.4% - 2.0%	0.7%	
Reduced LI subsidy pymt/discouts	\$3.00 - \$25.00	\$13.00	3.9% - 29.0%	16.4%	IF low income program
Shutoffs / Reconnects	\$0.10 - \$3.65	\$0.65	0.1% - 4.4%	0.5%	
Notices	\$0.05 - \$1.50	\$0.60	0.1% - 1.8%	0.9%	
Customer calls / collections	\$0.40 - \$1.60	\$0.90	0.2% - 1.9%	0.6%	

Source: Skumatz Economic Research Associates, Inc. 2014. *Non-Energy Benefits / Non-Energy Impacts (NEBS/NEIS) and Their Role & Values In Cost-Effectiveness Tests: State Of Maryland.*

⁴³ Skumatz Economic Research Associates, Inc. and Cadmus. 2010. *Non Energy Benefits: Status, Findings, Next Steps, and Implications for Low Income Program Analyses in California – Revised Report.*

⁴⁴ Skumatz Economic Research Associates, Inc. 2014. *Non-Energy Benefits / Non-Energy Impacts (NEBS/NEIS) and Their Role & Values In Cost-Effectiveness Tests: State Of Maryland.*

Therefore, for Focus on Energy, the evaluation team recommends that a per-participant value of \$23.25 (\$19.40 from 2014 adjusted for inflation) be applied to Tier 2 customers in the Insulation and Air Sealing offering in the Trade Ally Solutions (formerly the Home Performance with ENERGY STAR program) based on the results of the most direct benchmarking research available.

The evaluation team reviewed other, more recent evaluations of the impact of various program designs on the amount of debt carried by participants. One of these programs, a prepayment program in the upper Midwest, showed evidence that customers were able to eliminate approximately \$68 in total debt after participating in the program for at least a calendar year.

However, key differences between that program design and the low-income offerings in Wisconsin make direct comparisons difficult. These differences include the targeting and/or opening of that offering to customers who are not low-income. That is, the total debt paid off through that prepayment program is not necessarily comparable to the debt held by strictly low-income customers in Focus on Energy's offerings in Wisconsin.

Interpreting Test Results

No single benefit/cost test can provide a comprehensive understanding of program performance or impacts in isolation. The results of tests that measure overall program cost-effectiveness, such as the Modified TRC test, should be reviewed along with the results of other tests such as the UAT. Such a multi-perspective approach warrants a clear understanding of the tradeoffs among the tests.

Because of changes in avoided electric energy and natural gas costs and in emissions allowance prices for the current quadrennium (CY 2019-CY 2022), the cost-effectiveness results reported for Focus on Energy here are not directly comparable with results from its previous quadrennium (CY 2015-CY 2018). The changes to avoided costs tended to decrease the benefit/cost test results across all offerings when compared to the avoided costs used in the previous quadrennium.

In addition, changes in the calculation of incremental measure costs further reduce the comparability between quadrenniums, as the approach to measure cost calculation for many measures, including most custom measures, was revised between CY 2018, CY 2019, CY 2020 and CY 2021. As with avoided costs, these changes often decreased the benefit/cost ratio at the portfolio level compared to the previous quadrennium. These externalities have an impact on offering and overall portfolio cost-effectiveness; however, they do not directly reflect the overall performance of Focus on Energy.

Energy Avoided Costs

The PSC established the methodology to estimate electric and natural gas avoided energy costs for the CY 2019-CY 2022 Focus quadrennium under PSC docket 5-FE-101 (PSC REF#: 343909). The approach represents a continuation of the avoided cost methodology used for the CY 2015-CY 2018 quadrennium. The source for electric energy avoided costs are based on the Midcontinent Independent Transmission System Operator (MISO) forecasted locational marginal price, that is, the average of LMPs across Wisconsin nodes. Avoided natural gas costs are calculated based on Energy Information Administration

2018 Annual Energy Outlook forecasts of Henry Hub prices, adjusted using Wisconsin City Gate prices and retail prices.

Compared to the previous quadrennium, avoided costs calculated using updated price forecasts for the current quadrennium evaluation are lower by approximately 30%, on average.

The PSC established the step-by-step methodology to estimate avoided electric capacity costs for the CY 2019-CY 2022 Focus quadrennium under PSC docket 5-FE-101 (PSC REF#: 390566).⁴⁵ The approach relies upon MISO-established Cost of New Entry values as well as MISO Narrow Constrained Area net revenues to calculate avoided capacity costs. This methodology aligns with the PSC’s decision for the CY 2019-CY 2022 Focus quadrennium that, for the purposes of evaluating Focus on Energy, avoided capacity costs shall be based on the unit costs of a peaker plant.

The forecast model decreases the verified gross energy savings by the conventional attribution factor of NTG to derive net savings. The net savings are then increased by the line loss factor of 8% to account for avoided distribution losses. Table I-6 shows the assumptions for the CY 2018 through CY 2021 evaluation avoided costs used for the cost-effectiveness tests.

Table I-6. Avoided Costs

Avoided Cost	CY 2018	CY 2019	CY 2020	CY 2021
Electric Energy (\$/kWh) ^a	\$0.04747– \$0.06871	\$0.03093– \$0.04878	\$0.03093– \$0.05015	\$0.03093– \$0.05029
Electric Capacity (\$/kW year)	\$130.26	\$117.43–\$174.17	\$124.75–\$176.99	\$128.06–\$179.83
Gas (\$/therms)	\$0.802–\$1.278	\$0.538–\$0.764	\$0.524–\$0.777	\$0.546–\$0.785
Transmission and Distribution (\$/kW year)	N/A	N/A	\$66.34–\$68.61	\$66.40–\$68.74
Avoided Cost Inflation	0%	0%	0%	0%
Real Discount Rate	2%	2%	2%	2%
Line Loss	8%	8%	8%	8%

^a The CY 2021 cost-effectiveness analyses used a time series that grows from \$0.03093 to \$0.05029 over 14 years in the forecast model.

Avoided Transmission and Distribution Costs

In its Final Decision of June 1, 2020, the PSC directed the Environmental Working Group to propose to the PSC a method for calculating avoided T&D costs to be used for the purposes of evaluating Focus on Energy (PSC REF#: 390566). In its Final Decision of March 10, 2021, the PSC approved the Environmental Working Group’s recommended methodology to estimate avoided electric T&D costs for the CY 2019-CY 2022 Focus quadrennium under PSC docket 5-FE-101 (PSC REF#: 406591), with the direction to

⁴⁵ Public Service Commission of Wisconsin. June 1, 2020. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 390566. http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=390566

incorporate avoided T&D costs into a parallel analysis of benefits achieved by Focus on Energy offerings in Quadrennial Planning Process III and to revisit avoided T&D costs in Quadrennial Planning Process IV.

As stated in the commission order:⁴⁶

“In order to reduce the year-to-year variability of the costs, a four-year running average of the total miles and the annualized cost per mile per kW-Year are multiplied to get the average cost per kW-Year. For projecting values in future years, this approach escalates the most recent average MISO Cost of New Entry value by a growth factor that takes into account inflation and construction costs. The growth factor is calculated by taking the four-year average of construction cost growth as determined by the Wisconsin Department of Transportation in the Chained Fisher Construction Cost Index, and subtracting inflation (U.S. Bureau of Labor Statistics Consumer Price Index, Midwest Region⁴⁷), over the same period.”

Following the approval of calculating avoided T&D costs, the evaluation team, using the method specified above, established estimated avoided T&D costs per kW for each year from 2018 to 2051. These values are presented in Table I-7 and are based on the PSC’s Order in docket 5-FE-101.⁴⁸

Avoided T&D costs are not applied to renewable projects at this time as insufficient primary data currently exist to verify the net reduction, if any, in T&D needs that would be associated with installing local generation, such as through photovoltaics. Given the current guidance on program design, solar PV projects cannot be scaled at more than 125% of the baseline consumption of a given location, which caps the potential for an increase in capacity required at the installation location.

However, such projects could, in theory, leave the requirements for T&D largely unaffected, as similar values for total kWh could be consumed or generated at that location. Therefore, until further research establishes a specific baseline for T&D impacts based on consumption data for those renewable projects, the evaluation team recommends not applying T&D benefits to any local renewable projects.

⁴⁶ Public Service Commission of Wisconsin. March 10, 2021. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 406591. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=406591>.

⁴⁷ Bureau of Labor Statistics Midwest CPI Summaries available here: <https://www.bls.gov/regions/midwest/cpisummary/home.htm>

⁴⁸ Public Service Commission of Wisconsin. January 20, 2021. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 403255. <https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=403255>

Table I-7. Calculated and Forecasted Avoided T&D Costs

Year	Avoided T&D Cost (\$/kW-Yr)	Year	Avoided T&D Cost (\$/kW-Yr)
2018	\$66.22	2035	\$67.62
2019	\$66.28	2036	\$67.73
2020	\$66.34	2037	\$67.85
2021	\$66.40	2038	\$67.97
2022	\$66.47	2039	\$68.09
2023	\$66.54	2040	\$68.21
2024	\$66.61	2041	\$68.34
2025	\$66.69	2042	\$68.47
2026	\$66.76	2043	\$68.61
2027	\$66.85	2044	\$68.74
2028	\$66.93	2045	\$68.88
2029	\$67.02	2046	\$69.03
2030	\$67.11	2047	\$69.17
2031	\$67.21	2048	\$69.32
2032	\$67.31	2049	\$69.48
2033	\$67.41	2050	\$69.63
2034	\$67.51	2051	\$69.79

Emissions Benefits

The Modified TRC benefit/cost calculations include the benefit of avoiding three air pollutants that are regulated under the Clean Air Act. These are carbon dioxide, sulfur dioxide, and nitrogen oxide. Determining the emissions benefits requires three key parameters: lifecycle net energy savings, emissions factors or a tool that utilizes emissions factors, and the dollar value of the displaced emissions.

Emissions factors are the rate at which the criteria pollutants are emitted per unit of energy generated and are most often expressed in tons of pollutant per energy unit. Electric is in tons per megawatt hour, and gas is in tons per thousand therms. The product of the emissions factor and the net energy savings is the total weight of air pollutant offset or avoided by the program.

The product of the total tonnage of pollutant saved and the dollar value of the reduced emissions per ton is, therefore, the avoided emissions benefit, as shown in this equation:

$$\text{Value of Avoided Emissions} = [\text{Net Saved Energy} \times \text{Emissions Factor} \times \text{Value of Emissions Allowance}]$$

For CY 2021, the evaluation team assessed the electric emissions benefits for Focus on Energy using a tool developed by the EPA to calculate avoided emissions from renewable energy and energy efficiency programs (AVERT). AVERT is a spreadsheet-based model that uses historical hourly generation and emissions data to determine the individual power plants that are likely to be displaced by energy efficiency or renewable energy during each hour of the year.

To use AVERT to calculate electric emissions benefits, the lifecycle net electric savings for Focus on Energy needed to be attributed to an AVERT region. Previously, Wisconsin was allocated to two regions; however, in 2020 the EPA revised its regions and now Wisconsin falls into a single region.

Savings for Focus on Energy offerings are run through a region-specific version of AVERT to calculate the electric emissions benefits per offering. AVERT uses a model from the previous year to compare the electricity generation avoided by the Focus on Energy offerings during each hour of the year with the hourly generation information to determine the quantity of emissions displaced.

Table I-8 lists the gas emissions factor and allowance prices. The carbon dioxide emissions avoided from electric savings is derived from running the AVERT model processes. The carbon dioxide emissions avoided per unit of electricity saved varies from year-to-year based on a variety of model parameters including the mix of electric generation sources in the applicable EPA AVERT Region. For 2021, the electric emissions scalar derived from the AVERT model was 914.22 Tons of carbon dioxide per gigawatt hour. Note that this factor can be used to estimate avoided tons of carbon from electric savings, however, it is not exact, will not apply to any other years or EPA Regions, and will vary based on input GWh.

Table I-8. Emissions Factors and Allowance Price

Service Fuel Type	Carbon Dioxide	Nitrogen Oxide	Sulfur Dioxide
Gas Emissions Factor (tons/MThm)	5.85	N/A	N/A
Allowance Price (\$/ton)	\$15	\$7.50	\$2

For CY 2021, as in previous years, the evaluation team continued to obtain allowance prices for nitrogen oxide and sulfur dioxide emissions from the EPA’s Cross State Air Pollution Rule, most recently updated in 2018.⁴⁹ The team used the carbon dioxide emissions price in the PSC’s Order, docket 5-FE-101, PSC REF#: 343909, which states, “The Commission finds it reasonable for Focus cost-effectiveness tests to continue valuing avoided carbon dioxide emissions using a market-based value of \$15.00 per ton.”⁵⁰

The natural gas emissions factor has remained constant since the CY 2011 evaluation report and is derived from a best practice greenhouse gas inventory method developed by the California Energy Commission.⁵¹ Table I-9 lists the total avoided emissions by gas type in tons.

⁴⁹ U.S. Environmental Protection Agency. December 14, 2018. “Cross-State Air Pollution Rule.” <https://www.epa.gov/csapr>

⁵⁰ Public Service Commission of Wisconsin. June 6, 2018. *Quadrennial Planning Process III*. Order PSC Docket 5-FE-101, REF#: 343909. http://apps.psc.wi.gov/vs2015/ERF_view/viewdoc.aspx?docid=343909

⁵¹ California Air Resources Board. 2019. *California Greenhouse Gas Emissions for 2000 to 2017*. https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf

Table I-9 Total Avoided Emissions in Tons

Year	Carbon Dioxide	Nitrogen Oxide	Sulfur Oxide
CY 2019 Tons of Emissions Avoided	7,915,240	3,772	5,336
CY 2020 Tons of Emissions Avoided	7,761,679	3,921	5,183
CY 2021 Tons of Emissions Avoided	7,323,422	3,408	4,550

Table I-10 lists the emissions benefits for all programs by segment.

Table I-10. Total Emissions Benefits by Segment

Year	Residential	Nonresidential	Midstream ^a	Rural	Total
CY 2019 Emissions Benefits	\$25,422,131	\$91,289,103	N/A	\$2,092,656	\$118,803,890
CY 2020 Emissions Benefits	\$26,004,128	\$89,940,588	\$520,240	\$7,006,188	\$116,464,956
CY 2021 Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997

^a The Midstream Solution provides incentives for residential and nonresidential measures through a distributor-based delivery approach.

Offering Costs

The CY 2021 offering costs were provided to the evaluation team from Focus on Energy’s contract fiscal agent, the accounting firm Wipfli, and represent all costs associated with running the efficiency offerings (including administration and delivery costs). Note that incentive costs are not included as TRC costs because they are deemed transfer payments, which is consistent with industry guidelines defining the TRC test. Incentive costs are, however, used for other costs tests such as the UAT.

Incremental Costs

The gross incremental costs are the additional costs incurred by participants as a result of purchasing efficient equipment over and above a baseline nonqualified product. The evaluation team derived the gross incremental cost values used in this CY 2021 evaluation from the incremental cost study conducted by the administrator, implementers, and evaluation team. This study established up-to-date incremental costs for all measures based on the best available data, including historical Focus on Energy program data and independent research from other state programs.

One issue was observed in 2021 regarding the calculation of incremental measure costs for custom measures. In particular, for a handful of projects under the Large Energy User offering, several project files had incorrectly used the cost of an entire factory floor renovation instead of the smaller component related to energy efficiency systems management. This led to an overestimate of incremental measure costs for this offering of approximately \$37 million. Had those costs not been found, the overall portfolio would have appeared nearly 10% less cost effective, with a Modified TRC ratio dropping from 2.35 to 2.08.

Lost Revenue

To calculate the RIM test, the evaluation team determined an average value in lost revenue attributable to reductions in energy consumption due to program behavior. Table I-11 lists the assumptions.

Table I-11. Lost Revenue Inputs

	Weighted Average Rate (\$/kWh or therms)	Annual Net Lost Revenue	Average Measure Life	Total Lost Revenue
Residential Rate (kWh)	\$0.1217	\$15,024,268	10	\$139,041,762
Nonresidential Rate (kWh)	\$0.0655	\$21,277,258	15	\$276,366,491
Midstream Rate (kWh)	\$0.0801	\$228,856	15	\$2,956,781
Residential Rate (therms)	\$0.5540	\$1,521,837	17	\$21,875,794
Nonresidential Rate (therms)	\$0.3860	\$4,722,244	17	\$66,138,402
Midstream Rate (therms)	\$0.4381	\$168,806	16	\$2,255,988

Cost-Effectiveness Results by Test

Table I-12 presents the inputs and results from the Modified TRC test for the Focus on Energy CY 2021 energy efficiency and renewable resource portfolio. Application of the Modified TRC test with T&D benefits showed that net statewide benefits to residents, businesses, and Focus on Energy from the CY 2021 offerings were \$382,024,093.

Not including T&D, the benefits from the residential offerings were 1.49 times greater than the costs, while the benefits from the nonresidential offering outweighed the costs by a factor of 2.78. Benefits from the Midstream offering outweighed costs by a factor of 1.52. The Table also presents the results of the Modified TRC ratio but with the inclusion of T&D avoided costs. Adding these benefits increases the overall Modified TRC ratio to 2.35 from 2.15.

Table I-12. CY 2021 Sector-Level and Overall Results, Modified Total Resource Cost Test

	Residential	Nonresidential	Midstream	Total
Administrative Costs	\$1,274,307	\$1,384,391	\$45,810	\$2,704,508
Delivery Costs	\$10,079,722	\$18,004,640	\$585,951	\$28,670,313
Incremental Measure Costs	\$78,610,182	\$169,406,055	\$3,828,757	\$251,844,994
Total TRC Costs	\$89,964,211	\$188,795,087	\$4,460,517	\$283,219,815
Electric Benefits	\$76,513,262	\$285,969,696	\$2,120,897	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$133,749,777
Emissions Benefits	\$22,980,760	\$85,780,888	\$1,124,349	\$109,885,997
T&D Benefits	\$11,378,512	\$45,391,661	\$234,106	\$57,004,279
Total TRC Benefits	\$133,902,103	\$524,579,056	\$6,762,750	\$665,243,908
TRC Benefits Minus Costs	\$43,937,891	\$335,783,969	\$2,302,232	\$382,024,093
TRC Benefit/Cost Ratio	1.49	2.78	1.52	2.35
TRC Benefit/Cost Ratio without T&D Benefits	1.36	2.54	1.46	2.15

Table I-13 presents the inputs and results from the expanded TRC test for the Focus on Energy CY 2021 energy efficiency and renewable resource portfolio. The expanded TRC test includes economic benefits from the portfolio.

Table I-13. CY 2021 Overall Results, Expanded Total Resource Cost Test

	Total
Administrative Costs	\$2,704,508
Delivery Costs	\$28,670,313
Incremental Measure Costs	\$251,844,994
Total TRC Costs	\$283,219,815
Electric Benefits	\$364,603,856
Gas Benefits	\$133,749,777
T&D Benefits	\$57,004,279
Emissions Benefits	\$109,885,997
Economic Benefits	\$507,897,111
Total TRC Benefits	\$1,173,141,019
TRC Benefits Minus Costs	\$889,921,204
TRC Benefit/Cost Ratio	4.14
TRC Benefit/Cost Ratio without T&D Benefits	3.94

Table I-14 presents the inputs and results from the UAT for the CY 2021 Focus on Energy portfolio. With T&D benefits incorporated, the benefits from the residential offerings were 3.49 times greater than the costs, while the benefits from the nonresidential offerings outweighed the costs by a factor of 8.90.

Table I-14. CY 2021 Overall Results, Utility Administrator Cost Test

	Residential	Nonresidential	Midstream	Total
Incentive Costs	\$20,420,912	\$29,914,636	\$718,575	\$51,054,123
Administrative Costs	\$1,274,307	\$1,384,391	\$45,810	\$2,704,508
Delivery Costs	\$10,079,722	\$18,004,640	\$585,951	\$28,670,313
Total UAT Costs	\$31,774,941	\$49,303,667	\$1,350,336	\$82,428,944
Electric Benefits	\$76,513,262	\$285,969,696	\$2,120,897	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$133,749,777
T&D Benefits	\$11,378,512	\$45,391,661	\$234,106	\$57,004,279
Total UAT Benefits	\$110,921,343	\$438,798,168	\$5,638,401	\$555,357,911
UAT Benefits Minus Costs	\$79,146,401	\$389,494,501	\$4,288,065	\$472,928,967
UAT Benefit/Cost Ratio	3.49	8.90	4.18	6.74
UAT Benefit/Cost Ratio without T&D Benefits	3.13	7.98	4.00	6.05

Table I-15 shows the inputs and results from the RIM test for CY 2021 energy efficiency and renewable resource offerings. As expected, estimated benefit/cost value from the RIM test is less than 1. When interpreted within the context of the UAT test results, these findings indicate that, although annual Focus on Energy activities will probably induce theoretical upward pressure on future energy rates, total ratepayer energy costs will go down.

Table I-15. CY 2021 Sector-Level and Overall Results, Ratepayer Impact Measure Test

	Residential	Nonresidential	Midstream	Total
Incentive Costs	\$20,420,912	\$29,914,636	\$718,575	\$51,054,123
Electric Lost Revenues	\$160,230,347	\$289,474,209	\$2,956,781	\$452,661,338
Gas Lost Revenues	\$21,875,794	\$66,138,402	\$2,255,988	\$90,270,185
Administrative Costs	\$1,274,307	\$1,384,391	\$45,810	\$2,704,508
Delivery Costs	\$10,079,722	\$18,004,640	\$585,951	\$28,670,313
Total RIM Costs	\$213,881,083	\$404,916,279	\$6,563,105	\$625,360,467
Electric Benefits	\$76,513,262	\$285,969,696	\$2,120,897	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$133,749,777
Total RIM Benefits	\$99,542,831	\$393,406,507	\$5,404,295	\$498,353,632
RIM Benefits Minus Costs	\$(114,338,252)	\$(11,509,772)	\$(1,158,810)	\$(127,006,834)
RIM Benefit/Cost Ratio^a	0.47	0.97	0.82	0.80

^a For the CY 2021 cost-effectiveness analysis, the lost revenue portion of RIM test assumes a fixed utility rate that does not escalate over time; avoided energy costs are escalated on a yearly basis resulting in greater benefits than costs for the nonresidential portfolio.

Table I-16 shows the inputs and results from the societal test for CY 2021 energy efficiency and renewable resource offerings. As expected, estimated benefit/cost value from the societal test is the highest of all the tests, including the same costs as the Modified TRC, with additional non-energy benefits. When interpreted within the context of the Modified TRC test results, these findings suggest that substantial additional benefits are provided by Focus on Energy activities, generating additional value in terms of personal health cost savings, water savings, lighting purchase deferrals, property values, and arrearage repayment assistance. Including T&D benefits, the benefits from the residential offerings were 2.38 times greater than the costs, while the benefits from the nonresidential offerings outweighed the costs by a factor of 3.11.

Table I-16. CY 2021 Sector-Level and Overall Results, Societal Test

	Residential	Nonresidential	Midstream	Total
Administrative Costs	\$1,274,307	\$1,384,391	\$45,810	\$2,704,508
Delivery Costs	\$10,079,722	\$18,004,640	\$585,951	\$28,670,313
Incremental Measure Costs	\$78,610,182	\$169,406,055	\$3,828,757	\$251,844,994
Total Non-Incentive Costs	\$89,964,211	\$188,795,087	\$4,460,517	\$283,219,815
Electric Benefits	\$76,513,262	\$285,969,696	\$2,120,897	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$133,749,777
Emissions Benefits	\$22,980,760	\$85,780,888	\$1,124,349	\$109,885,997
T&D Benefits	\$11,378,512	\$45,391,661	\$234,106	\$57,004,279
Health Benefits	\$19,186,301	\$49,982,939	\$444,714	\$69,613,955
Water Benefits	\$9,739,948	\$2,321,827	\$220,020	\$12,281,795
Purchase Deferral Benefits	\$34,920,009	\$10,960,139	\$674,047	\$46,554,195
Other Non-Energy Benefits ^a	\$16,406,027	\$-	\$-	\$16,406,027
Economic Benefits	N/A	N/A	N/A	\$507,897,111
Total SOC Benefits	\$214,154,388	\$587,843,961	\$8,101,530	\$1,317,996,990
SOC Benefits Minus Costs	\$124,190,177	\$399,048,874	\$3,641,013	\$1,034,777,175
SOC Ratio	2.38	3.11	1.82	4.65
SOC Ratio without T&D Benefits	2.25	2.87	1.76	4.45

^a Includes Property Values and Arrearages

Cost-Effectiveness Results by Offering

Table I-17 and Table I-18 provide the sector-level and overall results of the cost-effectiveness analysis shown by core efficiency offerings, rural offerings, and renewables. In CY 2021, cost-effectiveness is presented in more detail because of the presence of rural and renewable programs. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs.

Table I-19 provides UAT rest results. Table I-20 provides RIM test results. Table I-21 provides societal test results.

Table I-17. CY 2021 Overall Cost-Effectiveness Analysis with Portfolio Breakout

Focus on Energy Benefits and Costs		Portfolio Breakout	Core Efficiency	Rural	Renewables
Incentives	\$51,054,123		\$43,783,750	\$3,530,287	\$3,397,534
Modified TRC Benefits	\$665,243,908		\$552,453,559	\$56,481,902	\$55,191,349
Modified TRC Costs	\$283,219,815		\$234,942,938	\$10,340,364	\$37,259,518
Portfolio TRC Ratio	2.35	Alone	2.35	5.46	1.48
		With Core		2.48	2.23
		With Core and Rural			2.35
		With Core, Rural, and Renewables			2.35

**Table I-18. CY 2021 Overall with Renewables Separate Cost-Effectiveness Analysis,
Modified Total Resource Cost Test**

	Residential	Nonresidential	Midstream	Renewables	Total
Incentive Costs ^a	\$19,043,336	\$27,749,393	\$718,575	\$3,542,820	\$51,054,123
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,670,313
Incremental Measure Costs	\$55,007,131	\$156,359,330	\$3,828,757	\$36,649,776	\$251,844,994
Total Non-Incentive Costs	\$66,034,146	\$175,445,299	\$4,460,517	\$37,279,853	\$283,219,815
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,897	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$-	\$133,749,777
Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997
T&D Benefits	\$7,273,085	\$40,592,169	\$234,106	\$8,904,919	\$57,004,279
Total TRC Benefits	\$108,758,449	\$494,531,361	\$6,762,750	\$55,191,349	\$665,243,908
TRC Benefits Minus Costs	\$42,724,303	\$319,086,061	\$2,302,232	\$17,911,496	\$382,024,093
TRC Ratio	1.65	2.82	1.52	1.48	2.35
TRC Ratio without T&D Benefits	1.54	2.59	1.46	1.24	2.15

^a Incentive costs are shown for clarity but were not included as part of Modified TRC costs for testing

**Table I-19. CY 2021 Overall with Renewables Separate Cost-Effectiveness Analysis,
Utility Administrator Cost Test**

	Residential	Nonresidential	Midstream	Renewables	Total
Incentive Costs	\$19,043,336	\$27,749,393	\$718,575	\$3,542,820	\$51,054,123
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,670,313
Total Non-Incentive Costs	\$30,070,351	\$46,835,362	\$1,350,336	\$4,172,896	\$82,428,944
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,897	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$-	\$133,749,777
T&D Benefits	\$7,273,085	\$40,592,169	\$234,106	\$8,904,919	\$57,004,279
Total UAT Benefits	\$88,673,385	\$412,310,032	\$5,638,401	\$48,736,093	\$555,357,911
UAT Benefits Minus Costs	\$58,603,034	\$365,474,670	\$4,288,065	\$44,563,197	\$472,928,967
UAT Ratio	2.95	8.80	4.18	11.68	6.74
UAT Ratio without T&D Benefits	2.71	7.94	4.00	9.55	6.05

Table I-20. CY 2021 Overall with Renewables Separate Cost-Effectiveness Analysis, Ratepayer Impact Measure Test

	Residential	Nonresidential	Midstream	Renewables	Total
Incentive Costs	\$19,043,336	\$27,749,393	\$718,575.00	\$3,542,820	\$51,054,123
Electric Lost Revenues	\$139,041,762	\$276,366,491	\$2,956,781	\$34,296,304	\$452,661,338
Gas Lost Revenues	\$21,875,794	\$66,138,402	\$2,255,988	\$-	\$90,270,185
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,130,172
Total RIM Costs	\$190,987,907	\$389,340,255	\$6,563,105	\$38,469,200	\$624,820,326
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,896.91	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,397.67	\$-	\$133,749,777
Total RIM Benefits	\$81,400,300	\$371,717,864	\$5,404,295	\$39,831,174	\$498,353,632
RIM Benefits Minus Costs	\$(109,587,607)	\$(17,622,392)	\$(1,158,810)	\$1,361,975	\$(126,466,693)
RIM B/C Ratio	0.43	0.95	0.82	1.04	0.80

Table I-21. Overall with Renewables Separate Cost-Effectiveness Analysis, Societal Test

	Residential	Nonresidential	Midstream	Renewables	Total
Incentive Costs ^a	\$19,043,336	\$27,749,393	\$718,575	\$3,542,820	\$51,054,123
Administrative Costs	\$1,196,648	\$1,315,478	\$45,810	\$146,573	\$2,704,508
Delivery Costs	\$9,830,367	\$17,770,491	\$585,951	\$483,504	\$28,670,313
Incremental Measure Costs	\$55,007,131	\$156,359,330	\$3,828,757	\$36,649,776	\$251,844,994
Total Non-Incentive Costs	\$66,034,146	\$175,445,299	\$4,460,517	\$37,279,853	\$283,219,815
Electric Benefits	\$58,370,732	\$264,281,053	\$2,120,897	\$39,831,174	\$364,603,856
Gas Benefits	\$23,029,568	\$107,436,811	\$3,283,398	\$-	\$133,749,777
Emissions Benefits	\$20,085,064	\$82,221,328	\$1,124,349	\$6,455,256	\$109,885,997
T&D Benefits	\$7,273,085	\$40,592,169	\$234,106	\$8,904,919	\$57,004,279
Health Benefits	\$17,872,834	\$48,347,981	\$444,714	\$2,948,426	\$69,613,955
Water Benefits	\$9,650,599	\$2,321,827	\$220,020	\$-	\$12,192,446
Purchase Deferral	\$34,245,962	\$10,960,139	\$674,047	\$-	\$45,880,149
Other Non-Energy Benefits ^b	\$16,406,027	\$-	\$-	\$-	\$16,406,027
Economic Benefits	N/A	N/A	N/A	N/A	\$507,897,111
Total SOC Benefits	\$186,933,871	\$556,161,308	\$8,101,530	\$58,139,775	\$1,317,233,594
SOC Benefits Minus Costs	\$120,899,725	\$380,716,008	\$3,641,013	\$20,859,922	\$1,034,013,779
SOC Ratio	2.83	3.17	1.82	1.56	4.65
SOC Ratio without T&D Benefits	2.72	2.94	1.76	1.32	4.45

^a Incentive costs are shown for clarity but were not included as part of Societal costs for testing

^b Includes property values and arrearages

Table I-22 provides the residential offerings cost-effectiveness analysis. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs. The values provided are exclusive of renewable and rural offerings.

Table I-22. CY 2021 Residential and Midstream Offerings Cost-Effectiveness Analysis

	Direct to Customer				Trade Ally Solutions		Residential New Construction	Midstream
	Online Marketplace ^a	Packs	Retail ^b	Income Qualified	Building Shell	Heating and Cooling		
Incentive Costs	\$1,585,413	\$1,467,133	\$4,536,912	\$3,269,176	\$2,102,473	\$4,141,401	\$1,742,908	\$718,575
Administrative Costs	\$94,186	\$87,159	\$269,529	\$194,215	\$143,654	\$282,967	\$104,802	\$45,810
Delivery Costs	\$653,158	\$604,429	\$1,869,116	\$1,346,834	\$1,413,403	\$2,784,088	\$783,822	\$585,951
Incremental Measure Costs	\$3,013,411	\$2,105,993	\$1,569,465	\$8,313,218	\$10,363,693	\$29,528,214	\$-	\$3,828,757
Total Non-Incentive Costs	\$3,760,756	\$2,797,582	\$3,708,109	\$9,854,267	\$11,920,751	\$32,595,269	\$888,625	\$4,460,517
Electric Benefits (kWh)	\$3,451,274	\$4,861,400	\$4,886,667	\$24,012,970	\$1,775,074	\$2,955,700	\$-	\$1,592,420
Electric Benefits (kW)	\$570,595	\$1,940,273	\$2,080,473	\$8,030,778	\$2,570,173	\$701,171	\$-	\$528,477
T&D Benefits	\$268,675	\$897,040	\$986,249	\$3,674,422	\$1,088,020	\$292,498	\$-	\$234,106
Gas Benefits	\$3,078,434	\$3,766,833	\$467,451	\$-	\$3,927,280	\$11,323,337	\$378,759	\$3,283,398
Emissions Benefits	\$1,842,463	\$2,504,006	\$2,006,930	\$9,268,873	\$1,287,946	\$2,943,135	\$64,013	\$1,124,349
Total TRC Benefits	\$9,211,441	\$13,969,551	\$10,427,771	\$44,987,042	\$10,648,494	\$18,215,842	\$442,771	\$6,762,750
TRC Benefits Minus Costs	\$5,450,686	\$11,171,970	\$6,719,661	\$35,132,775	(\$1,272,257)	(\$14,379,427)	(\$445,853)	\$2,302,232
TRC Ratio Benefits	2.45	4.99	2.81	4.57	0.89	0.56	0.50	1.52
TRC Ratio without T&D	2.38	4.67	2.55	4.19	0.80	0.55	0.50	1.46

^a Includes Online Marketplace and Online Marketplace – Limited Time Offer subofferings.

^b Includes “Retail, Retail Lighting, Pop Up Retail, and Retail Products subofferings, excluding Rural Pop Up.

Table I-23 provides nonresidential offerings cost-effectiveness analysis. Incentive costs are provided below, but they are not included in the TRC calculation. The TRC ratio equals the total TRC benefits divided by total non-incentive costs. The values provided are exclusive of rural and renewable programs.

Table I-23. CY 2021 Nonresidential Offerings Cost-Effectiveness Analysis

	Business and Industry		Business New Construction		Schools and Government		Pilots
	C&I	Large Industrial	Design Assistance	Prescriptive	School	Government	Virtual Commissioning
Incentive Costs	\$5,965,128	\$8,293,665	\$4,030,446	\$1,207,016	\$3,168,647	\$1,800,088	\$68,109
Administrative Costs	\$260,970	\$362,843	\$189,455	\$56,737	\$193,317	\$109,822	\$2,168
Delivery Costs	\$3,846,255	\$5,347,672	\$2,421,060	\$725,046	\$2,167,866	\$1,231,551	\$7,365
Incremental Measure Costs	\$36,247,035	\$40,466,571	\$24,551,313	\$6,598,142	\$24,542,408	\$16,302,376	\$-
Total Non-Incentive Costs	\$40,354,260	\$46,177,086	\$27,161,828	\$7,379,924	\$26,903,591	\$17,643,750	\$9,533
Electric Benefits (kWh)	\$45,284,816	\$56,810,609	\$16,810,366	\$8,101,525	\$11,645,014	\$9,570,449	\$55,976
Electric Benefits (kW)	\$26,920,390	\$24,919,678	\$11,898,998	\$5,164,651	\$8,056,596	\$3,990,889	\$-
T&D Benefits	\$11,859,013	\$10,956,728	\$5,049,007	\$2,275,950	\$3,565,121	\$1,754,899	\$-
Gas Benefits	\$11,195,503	\$47,526,083	\$15,570,781	\$4,539,970	\$11,667,650	\$11,067,550	\$-
Emissions Benefits	\$18,847,193	\$29,643,799	\$8,672,112	\$3,781,757	\$6,283,674	\$5,396,641	\$21,609
Total TRC Benefits	\$114,106,915	\$169,856,897	\$58,001,264	\$23,863,852	\$41,218,055	\$31,780,426	\$77,585
TRC Benefits Minus Costs	\$73,752,655	\$123,679,812	\$30,839,436	\$16,483,928	\$14,314,464	\$14,136,676	\$68,052
TRC Ratio	2.83	3.68	2.14	3.23	1.53	1.80	8.14
TRC Ratio without T&D Benefits	2.53	3.44	1.95	2.93	1.40	1.70	8.14

Table I-24 provides results of the cost-effectiveness analysis for offerings targeted to customers in rural areas. The values provided are exclusive of renewable programs.

Table I-24. CY 2021 Rural Non Renewable Cost-Effectiveness Analysis

	Direct to Customer		Trade Ally Solutions	Business and Industry	
	Farmhouse Kits	Pop-Up Retail	Building Shell Rural	Agribusiness	Non-Agriculture Rural
Incentive Costs	\$8,852	\$151,372	\$37,571	\$2,064,249	\$1,122,956
Administrative Costs	\$663	\$11,334	\$8,131	\$90,181	\$49,058
Delivery Costs	\$9,920	\$169,624	\$195,965	\$1,308,632	\$711,899
Incremental Measure Costs	\$8,152	\$104,984	\$-	\$4,628,054	\$3,023,432
Total Non-Incentive Costs	\$18,735	\$285,942	\$204,096	\$6,026,867	\$3,784,389
Electric Benefits (kWh)	\$19,959	\$373,683	\$-	\$17,197,915	\$6,035,041
Electric Benefits (kW)	\$7,461	\$133,079	\$-	\$8,829,503	\$2,988,636
T&D Benefits	\$3,464	\$62,717	\$-	\$3,821,316	\$1,310,135
Gas Benefits	\$23,125	\$64,350	\$-	\$2,121,590	\$3,747,684
Emissions Benefits	\$10,314	\$157,384	\$-	\$6,714,704	\$2,859,840
Total TRC Benefits	\$64,324	\$791,213	\$0	\$38,685,029	\$16,941,337
TRC Benefits Minus Costs	\$45,589	\$505,271	(\$204,096)	\$32,658,162	\$13,156,947
TRC Ratio	3.43	2.77	N/A	6.42	4.48
TRC Ratio without T&D Benefits	3.25	2.55	N/A	5.78	4.13

Cost-Effectiveness Results for Renewables

Table I-25 lists the CY 2019, CY 2020, and CY 2021 cost-effectiveness results, with renewables excluded and with renewables included. CY 2021 values include T&D benefits.

Table I-25. Cost-Effectiveness Results for Focus on Energy Portfolio

Calendar Year	Residential	Nonresidential	Midstream	Renewables	Total
CY 2019: Modified TRC Test Result with Renewables	1.70	2.99	N/A	N/A	2.58
CY 2019: Modified TRC Test Result Renewables Excluded	1.79	3.11	N/A	1.51	2.58
CY 2020: Modified TRC Test Result with Renewables	1.70	2.78	1.45	N/A	2.43
CY 2020: Modified TRC Test Result Renewables Excluded	2.07	2.86	1.45	1.24	2.43
CY 2021: Modified TRC Test Result with Renewables	1.49	2.78	1.52	N/A	2.35
CY 2021: Modified TRC Test Result Renewables Excluded	1.65	2.82	1.52	1.48	2.35

Appendix J. Residential Survey Findings by Offering

Direct To Customer Solution: Online Marketplace

In December 2021 and January 2022, the evaluation team conducted an online survey of CY 2021 Online Marketplace participants who purchased items between January and September 2021. Participants were selected for the survey sample frame based on the measures they purchased from the Online Marketplace. The team contacted a census of participants for measures rarely purchased and a random sample of participants for measures more commonly purchased.

Respondents were asked questions for up to three measures, if those measures were purchased individually, or all measures if they purchased a product bundle.

The evaluation team completed surveys with 479 respondents covering 901 measures (Table J-1). The team met the survey quotas of 70 responses per measure for measures more frequently purchased through random sampling, but it did not achieve 70 responses per measure for the less frequently purchased lighting measures, despite attempting a census.

Table J-1. CY 2021 Survey Sample and Response by Measure

Measure ^a	Limited-Time Offer Bundles		Individually Purchased Items		Total	
	Survey Sample Frame	Completed Surveys	Survey Sample Frame	Completed Surveys	Survey Sample Frame	Completed Surveys
Aerators	2,646	132	293 ^b	32	2,939	164
Showerheads	1,750	87	369 ^b	41	2,119	128
Smart thermostats	N/A	N/A	1,751	104	1,751	104
Advanced power strips	N/A	N/A	707 ^b	73	707 ^b	73
Standard LEDs	N/A	N/A	954	101	954	101
Globe LEDs	1,750	87	290 ^b	29	2040	116
Reflector LEDs	896 ^b	45	699 ^b	65	1,595 ^b	110
Decorative LEDs	N/A	N/A	449 ^b	54	449 ^b	54
3-way LEDs	N/A	N/A	405 ^b	51	405 ^b	51
Total Respondents	2,646	132	3,740	347	6,386	479

^a Respondents could be asked about up to three measures.

^b The sample frame was a census of contactable records.

Aside from questions about purchase motivation and satisfaction with the items purchased, process evaluation questions referred to a participant’s experience with the offering overall rather than the specific items they purchased. As a result, survey results are generally not reported by measure.

Participation Experience

The Online Marketplace is a website where customers can order individual energy-saving products, such as LEDs, aerators, showerheads, smart thermostats, and advanced power strips, at discounted prices. In

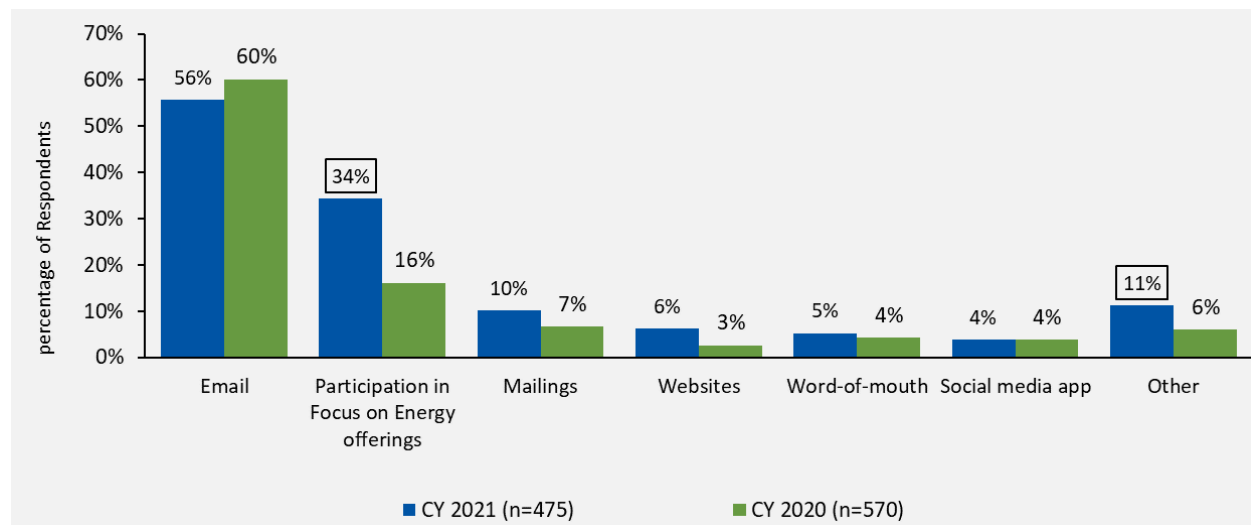
CY 2021, the offering also included three limited-time offer bundles; two of these (efficient kitchen and bathroom product bundles) were included in the sample period.⁵²

Sources of Awareness

As shown in Figure J-1, respondents most frequently heard about the Online Marketplace offering through email (56%), which was also the main source in CY 2020 (60%). Of these respondents, 91% (n=257) identified the sender as Focus on Energy, and 9% said their utility. Mailings were a source of awareness for 10% of respondents. Among those respondents, 22% (n=46) identified Focus on Energy as the sender, while 78% said the mailings were sent by utilities. Other sources of awareness included online advertising, internet searches, community and utility events, utility and Focus on Energy representatives, and employers.

The percentage of CY 2021 participants who mentioned previous participation in Focus on Energy offerings (34%) more than doubled from the CY 2020 rate (16%), indicating that many CY 2021 respondents were repeat customers of the Online Marketplace.⁵³ Other sources of awareness included online advertising, internet searches, community and utility events, utility and Focus on Energy representatives, and employers.

Figure J-1. Awareness Sources of Online Marketplace Offering



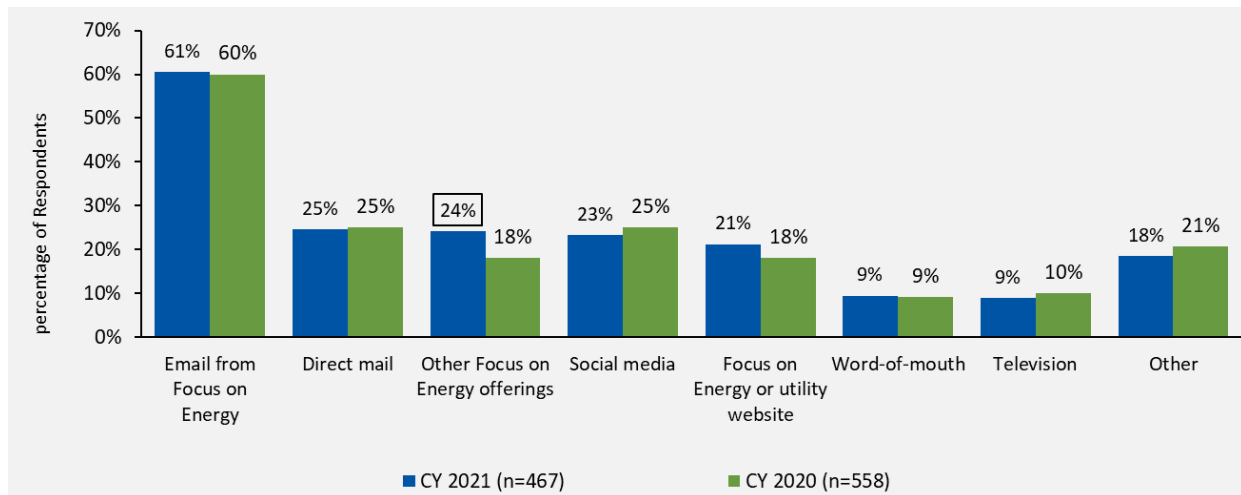
Source: CY 2021 Online Marketplace Offering Participant Survey, Question B1. “Where have you heard about Focus on Energy discounts for [LIST OF PURCHASED MEASURES] available through the Online Marketplace?” Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference from CY 2020 result at $p < 0.05$ using a t-test.

⁵² The Online Marketplace offered an “All-in-One Savings Bundle” and dusk-to-dawn bulbs as limited-time offers at the end of CY 2021 after the team created the survey sample. Participants in those offerings are not represented in survey results.

⁵³ Focus on Energy research confirmed that nearly half of CY 2021 Online Marketplace orders came from repeat customers (*Focus on Energy CY2021 Quarter 4 Performance Report*, p. 10).

Respondents reported what they thought would be the best ways for Focus on Energy to inform people about energy efficiency offerings (Figure J-2). Most respondents said that email from Focus on Energy was the best way to inform the public (61%), which closely corresponded to the percentage of those who learned about Online Marketplace from that channel (56%, Figure J-1). The responses to this question were generally similar to CY 2020, though significantly more CY 2021 participants mentioned cross-promotion through other Focus on Energy offerings (24%), compared to CY 2020 (18%). Responses categorized as “other” included community and utility events, print media, radio, and utility bill inserts.

Figure J-2. Best Ways to Inform Customers about Energy Efficiency Offerings

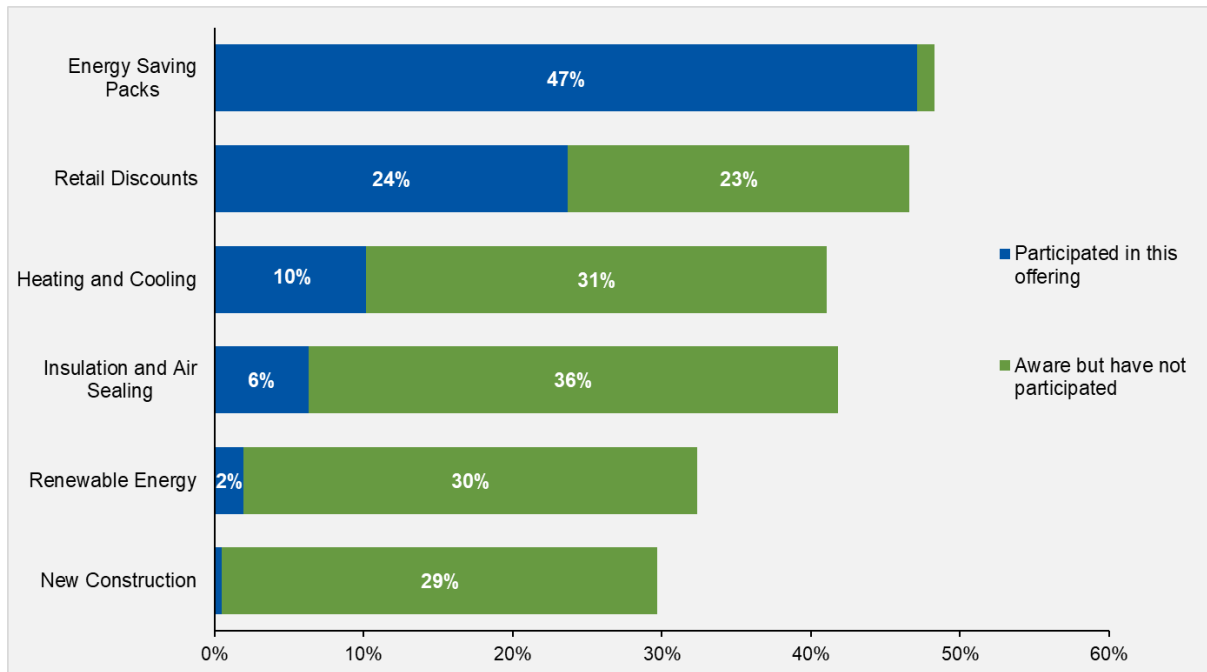


Source: CY 2021 Online Marketplace Offering Participant Survey, Question B2. “What is the best way for Focus on Energy to inform people about energy efficiency offerings?” Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference from CY 2020 results at $p < 0.05$ using a t-test.

Awareness of Other Offerings

The evaluation team asked respondents about their awareness of other Focus on Energy offerings and whether they participated in other offerings. About half (49%, n=414) were aware of other Focus on Energy offerings in CY 2021, comparable to the rate in CY 2020 (51%, n=506). As shown in Figure J-3, CY 2021 respondents most frequently participated in the Energy Savings Packs offering (47%), which was also the most common offering in CY 2020 (48%, n=506). Significantly more respondents said they took advantage of retail discounts in CY 2021 (24%) than respondents in CY 2020 (14%, n=506); otherwise, awareness and participation rates in CY 2021 were very similar to CY 2020.

Figure J-3. Awareness of Other Offerings

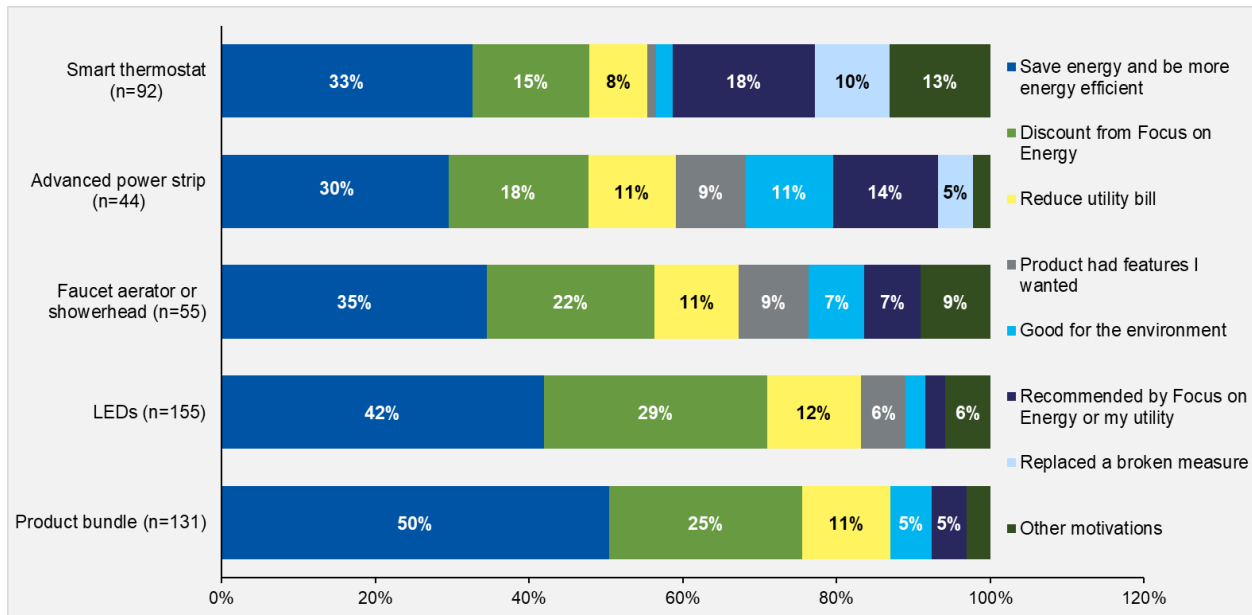


Source: CY 2021 Online Marketplace Offering Participant Survey, Questions B3. “Other than Focus on Energy’s Online Marketplace, are you aware of any other Focus on Energy offerings or rebates?” and B4. “For the Focus on Energy offerings and rebates listed below, please indicate which ones you are aware of, and which you have participated in.” (n=414). Unlabeled segments represent 1% or less of measure respondents.

Motivation

Saving energy was the most important motivation for respondents who purchased every type of measure (Figure J-4), especially for those who purchased limited-time offer product bundles (50%) and LEDs (42%). This was followed by discounted prices (15% to 29%) for those who purchased every type of measure, except for smart thermostats, for which respondents more often cited recommendations from Focus on Energy and utilities (18%). Respondents who purchased advanced power strips also cited recommendations from Focus on Energy and utilities (14%) more often than those purchasing other measures. Respondents said other miscellaneous motivations were recommendations from friends and relatives, product aesthetics, and wanting the latest technology.

Figure J-4. Motivation for Purchasing Measures

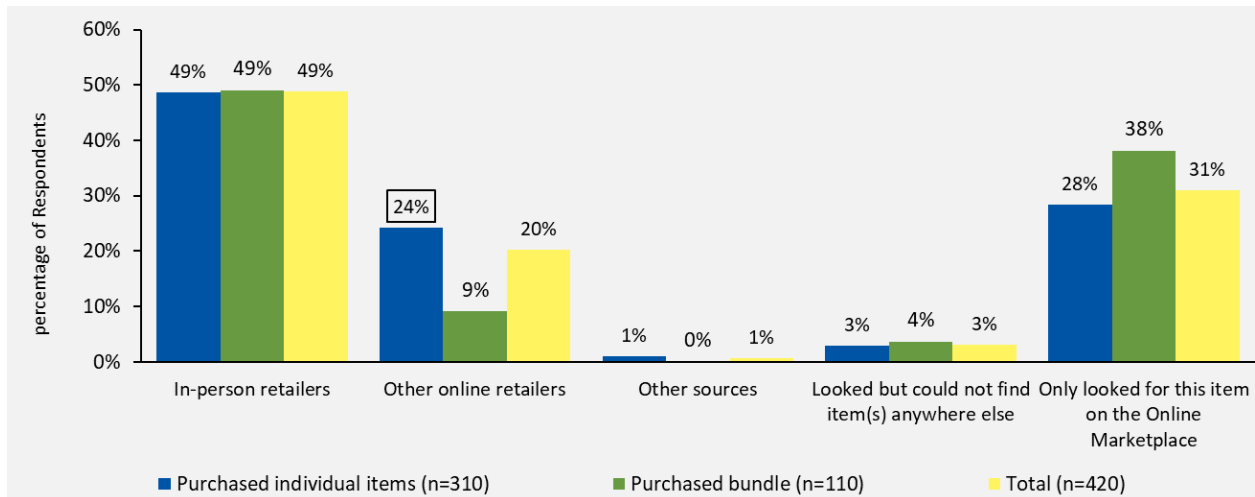


Source: CY 2021 Online Marketplace Offering Participant Survey, Question C1. “What was the most important reason you purchased your [MEASURE]?” Unlabeled segments represent 3% or less of measure respondents.

Decision-Making

About half of respondents (49%) considered purchasing the items they bought from the Online Marketplace through an in-person retailer and 20% considered another online retailer (Figure J-5). About a third (31%) did not look for the items they purchased anywhere else, and 3% looked but could not find those items anywhere else. Compared to respondents who purchased individual items from the Online Marketplace, respondents who purchased limited-time offer product bundles were less likely to consider other online retailers (9%) and more likely to have not considered retailers other than the Online Marketplace (38%).

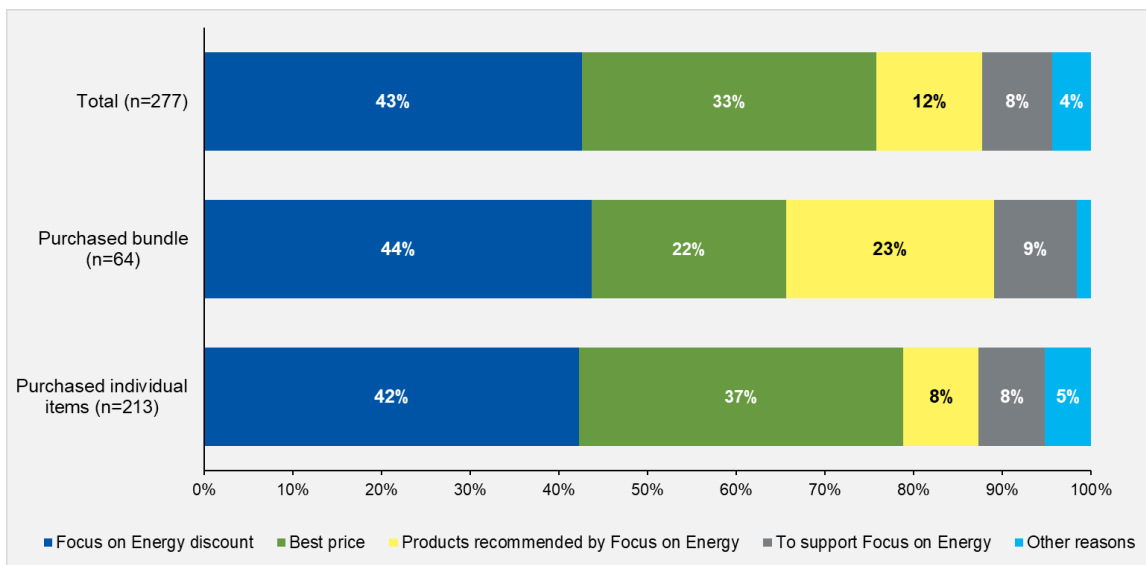
Figure J-5. Consideration of Other Retail Outlets



Source: CY 2021 Online Marketplace Offering Participant Survey, Question C2. “Before you purchased your [LIST OF PURCHASED MEASURES] from the Online Marketplace, where else did you consider purchasing this/these items(??)” Boxes around percentages indicate a statistically significant difference at $p < 0.05$ using a t-test.

The evaluation team asked respondents who considered other retail outlets why they chose to purchase their items from the Online Marketplace (Figure J-6). Overall, respondents most frequently said the Focus on Energy discount (43%), followed by the Online Marketplace offering the best price (33%). Respondents who purchased product bundles more frequently said that Focus on Energy recommended the products (23%) than those who bought individual items (8%). Other reasons cited by respondents included the convenience of shopping at the Online Marketplace and the availability of product models or features they could not find elsewhere.

Figure J-6. Reason for Purchasing from the Online Marketplace

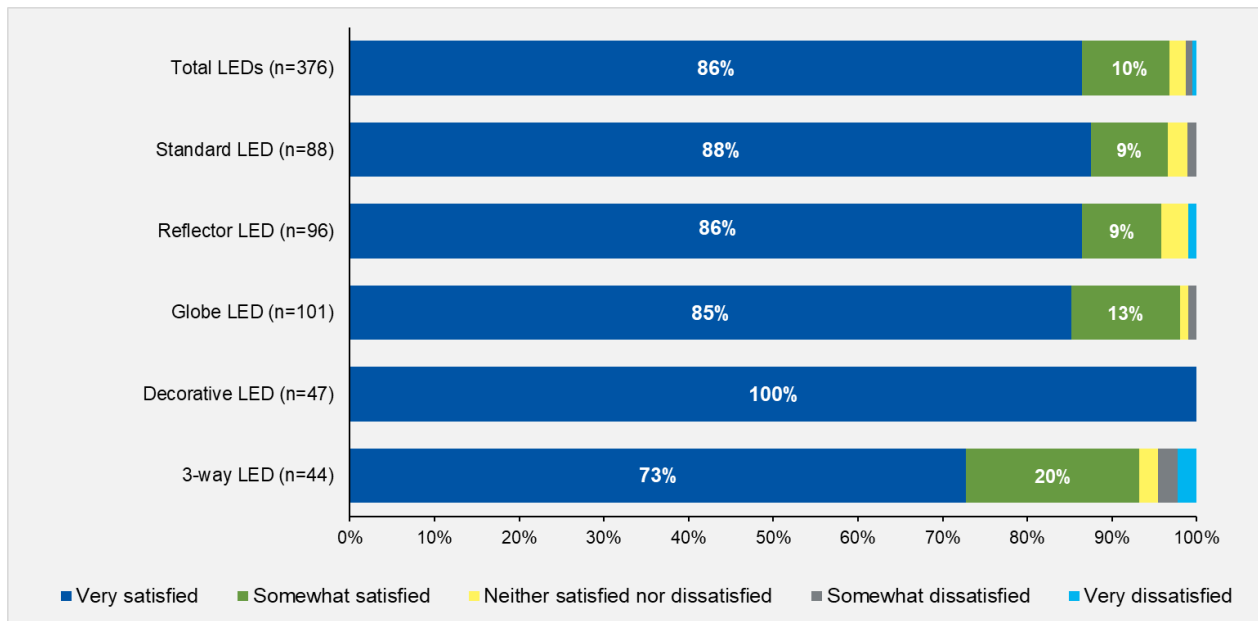


Source: CY 2021 Online Marketplace Offering Participant Survey, Question C3. “What’s the primary reason you decided to purchase from the Online Marketplace?” Unlabeled segments represent 3% or less of measure respondents.

Satisfaction

The evaluation team asked respondents to rate their satisfaction with the measures they purchased from the Online Marketplace. Overall, 96% of respondents who purchased LEDs of any type were *very satisfied* or *somewhat satisfied* with the lighting they purchased (Figure J-7). Decorative LEDs received the highest ratings, with 100% of respondents who purchased them giving *very satisfied* ratings. Three way LEDs received somewhat lower ratings than other LEDs, though 93% of these respondents were *very satisfied* or *somewhat satisfied*.

Figure J-7. Satisfaction with Lighting Measures Purchased

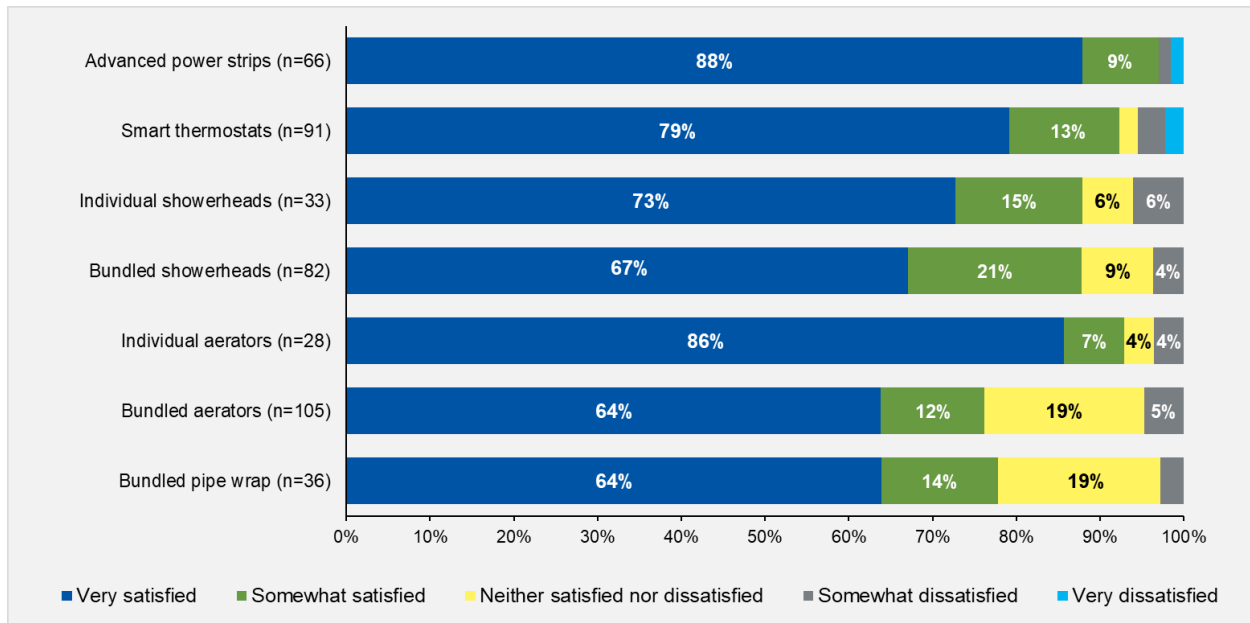


Source: CY 2021 Online Marketplace Offering Participant Survey, Questions C4. “How satisfied are you with the [MEASURE](s) you purchased?” Unlabeled segments represent 3% or less of measure respondents.

Respondents also gave high satisfaction ratings for non-lighting measures they purchased from the Online Marketplace (Figure J-8). Advanced power strips and smart thermostats received very high ratings, with more than 90% of respondents saying they were *very satisfied* or *somewhat satisfied* with these measures. Faucet aerators received similar high ratings from customers who purchased these items individually from the Online Marketplace (93% *satisfied*), but ratings for aerators were significantly lower from customers who purchased them as part of a limited-time offer product bundle (76% *satisfied*).⁵⁴ However, there was little difference in showerhead ratings between customers who purchased these measures individually or as part of a product bundle (both 88% *satisfied*). Pipe wrap was not available as an individual item for sale in the Online Marketplace but was offered as part of the efficient kitchen product bundle; 78% of respondents said they were *very* or *somewhat satisfied* with this measure.

⁵⁴ Statistically significant difference at p<0.05 using a t-test.

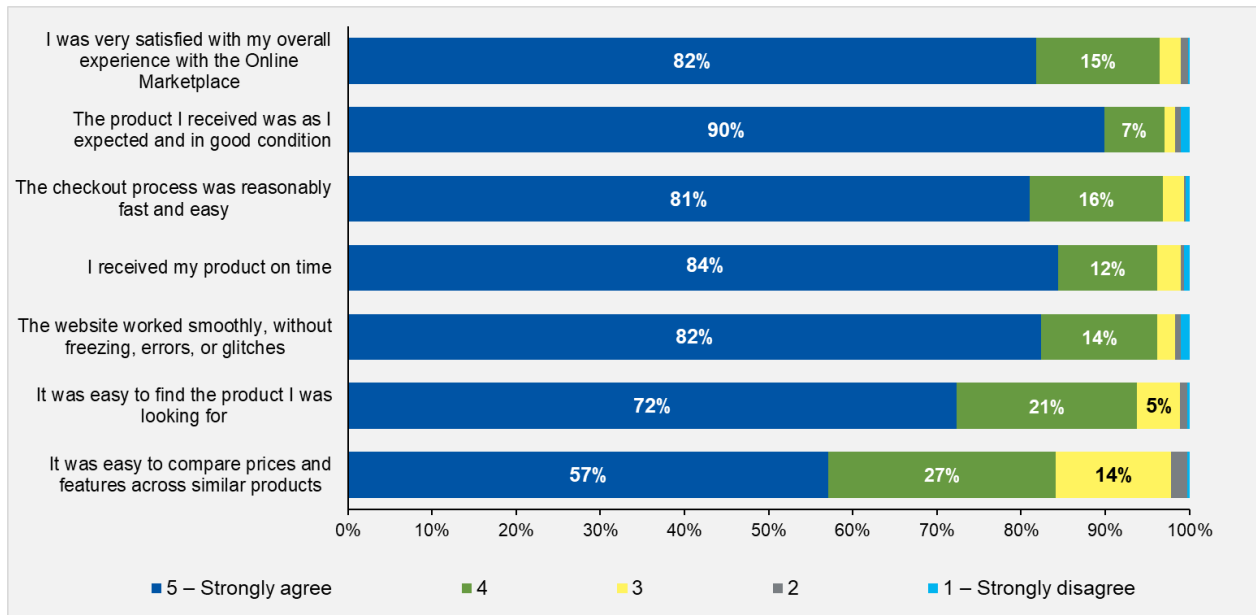
Figure J-8. Satisfaction with Non-Lighting Measures Purchased



Source: CY 2021 Online Marketplace Offering Participant Survey, Questions C4. “How satisfied are you with the [MEASURE](s) you purchased?” Unlabeled segments represent 3% or less of measure respondents.

The evaluation team asked respondents to rate statements regarding their satisfaction with different elements of their experience purchasing items from the Online Marketplace (Figure J-9). Most respondents *strongly agreed* with every item rated, including 82% who *strongly agreed* that they were *very satisfied* with their overall experience with the Online Marketplace. Respondents gave the lowest ratings for the statements “it was easy to find the product I was looking for” (72% *strongly agree*) and “it was easy to compare prices and features across similar products” (57% *strongly agree*). Respondents who purchased limited-time offer product bundles and individual items gave similar ratings for these statements.

Figure J-9. Customer Ratings for Elements of the Shopping Experience



Source: CY 2021 Online Marketplace Offering Participant Survey, Question C4. “Please rate your agreement with the following statements about the Online Marketplace on a scale from 1 to 5 with 1 being *strongly disagree* and 5 being *strongly agree*.” (n=408 to 477 by item rated). Unlabeled segments represent 3% or less of measure respondents.

Suggestions for Improvement

At the end of the survey, the evaluation team asked respondents for suggestions to improve the Online Marketplace. Eighty-five percent of respondents had either no feedback or only positive feedback. Comments from the 15% of respondents who made suggestions were categorized as follows:

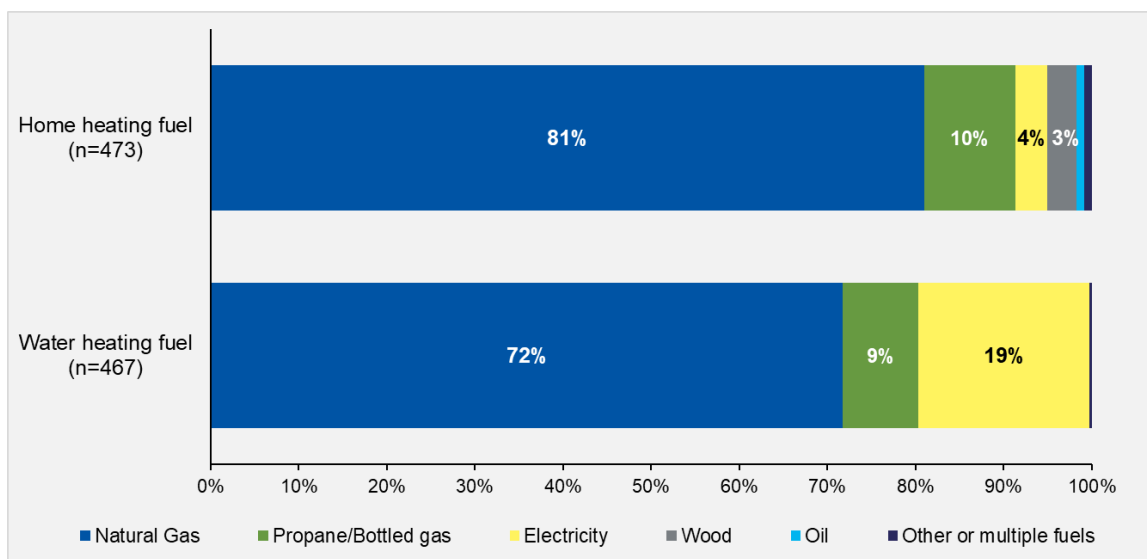
- **Offer more items/more variety (n=23):** respondents wanted items not currently available through the Online Marketplace (appliances and emerging technologies), or more options and styles for items currently available (aerators, showerheads, and LEDs).
- **Improve communications about offerings (n=15):** respondents said important details about the offering were not communicated (such as order limits) or wanted to hear about offerings more often or through different channels.
- **Improve product information/product display (n=12):** respondents wanted more information or more details about items, information about comparable items from other sellers, better visual display and organization of products on the website, and improved search functions.
- **Improve ordering and delivery (n=5):** respondents suggested ways to streamline the ordering process and shipping and delivery processes.
- **Do not limit order quantities (n=4):** respondents wanted to order more items than the offering currently allows.
- **Offer more frequent sales, deals, and promotions (n=4):** respondents requested more promotions through the Online Marketplace.

- **More options for bundling items (n=3):** two respondents wanted customizable bundles, and one respondent wanted to order larger packages of individual items.
- **Other suggestions (n=4):** one comment apiece about: smart thermostats not being available for rural LP gas customers, website crashes delaying an order, and suggestions to lower shipping costs and offer only American-made products.

Home Characteristics and Demographics

Most respondents used natural gas for space heating (81%) and water heating (72%) in their homes (Figure J-10). Only 4% of respondents heated their homes with electricity, though 19% had electric water heaters.

Figure J-10. Home and Water Heating Fuel Types

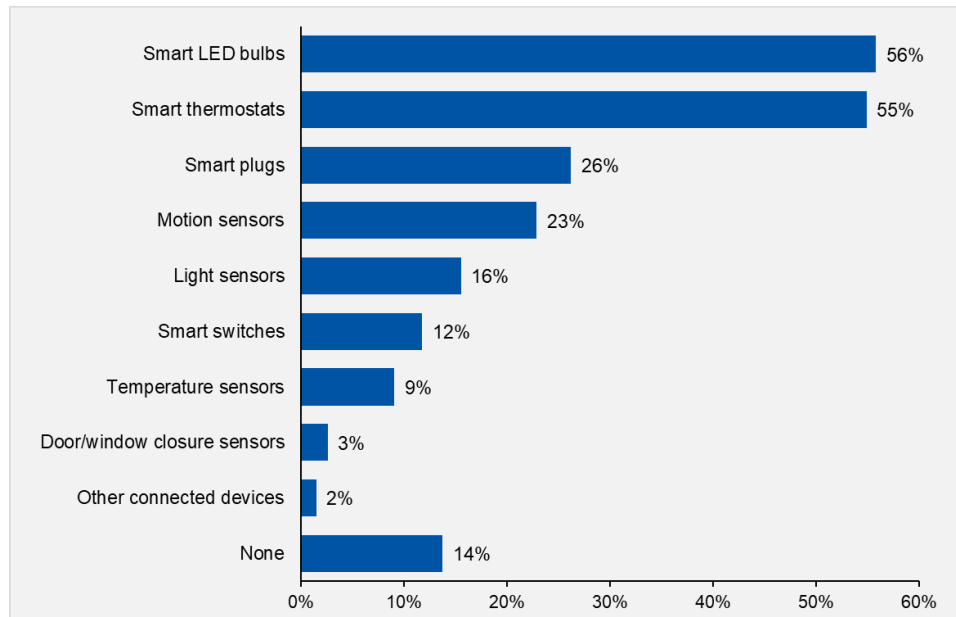


Source: CY 2021 Online Marketplace Offering Participant Survey, Questions L1. “What type of fuel does your water heater use?” and L2. “What is the main type of fuel you use to heat your home?”
 Unlabeled segments represent 2% or less of measure respondents.

Many respondents reported that they have smart LED bulbs⁵⁵ (56%) and smart thermostats (55%) in their homes, and only 14% said they did not have any energy-saving connected devices (Figure J-11). Other connected devices included flood sensors, garage door openers, water heaters, and “solar motion lights.”

⁵⁵ The high percentage of respondents who said they have smart LED bulbs can be explained if respondents considered all LEDs to be smart lighting choices, as opposed to the intended question about Wi-Fi connected light bulbs.

Figure J-11. Smart Devices in the Home



Source: CY 2021 Online Marketplace Offering Participant Survey, Question L3. “What connected devices that help save energy do you have installed in your home?” (n=450). Multiple responses accepted.

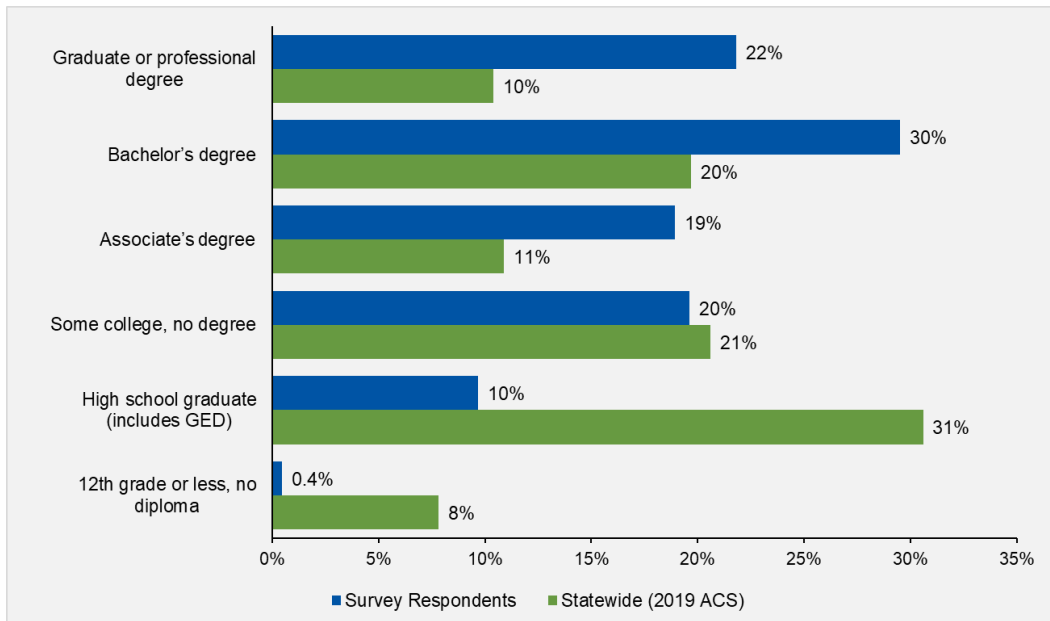
Most respondents reported living in single-family detached houses (86%, n=478), with the remainder living in attached townhouses, row houses, or duplexes (6%), multifamily housing (5%), or mobile or manufactured homes (3%). Ninety-five percent of respondents owned their homes (n=477), and the remaining respondents rented their homes (5%). In comparison, 67% of Wisconsin residents live in single-family detached homes and 67% own their homes.⁵⁶ Respondents who purchased product bundles were more likely to be renters (8%, n=131) than those who purchased individual items from the Online Marketplace (3%, n=346).

About half of respondents (52%) completed a bachelor’s or graduate-level degree (Figure J-12), which was higher than the statewide average of 30%.⁵⁷

⁵⁶ Source: 2019 ACS census data.
<https://data.census.gov/cedsci/table?tid=ACSDP5Y2019.DP04&g=0400000US55>

⁵⁷ Ibid.

Figure J-12. Respondent Education Level



Source: CY 2021 Online Marketplace Offering Participant Survey, Question L6. “What is the highest level of school that you have completed?” (n=454). U.S. Census 2019 ACS, Selected Social Characteristics in the United States.

Trade Ally Solution: Renewable Energy

In October and November 2021, the evaluation team contacted a sample of CY 2021 residential and business Renewable Energy participants to assess their experience. The evaluation team reached their target of 70 residential completions out of a random sample frame of 873 participants. Additionally, the team collected 38 business responses from a population of 112 participants with contact information in the tracking data.

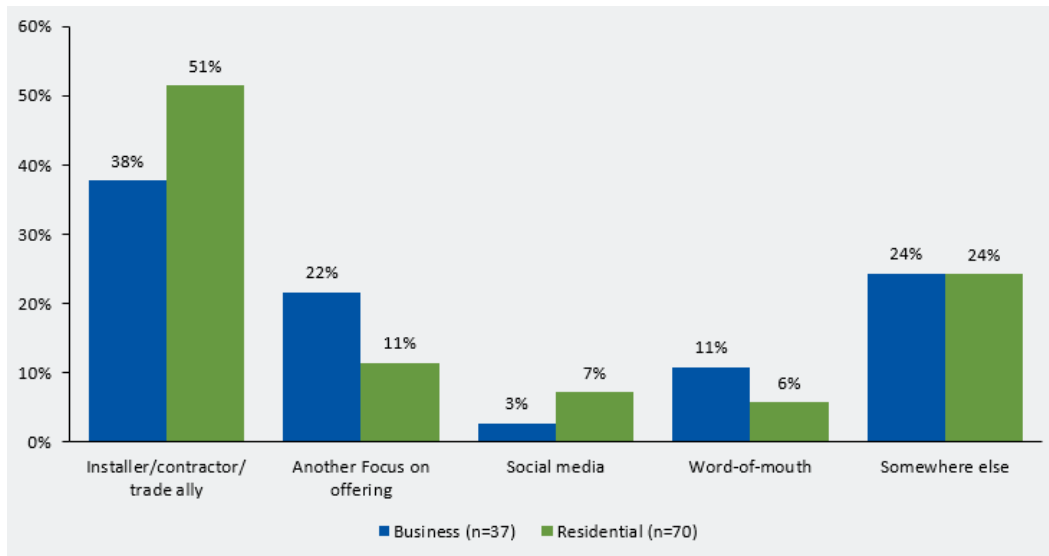
Participation Experience

The Renewable Energy Offering supports the installation of PV systems in residences and businesses by providing rebates and bonuses for the installation of qualified systems.

Sources of Awareness

As shown in Figure J-13, both business and residential respondents most frequently heard about the offering through an installer, contractor, or trade ally (38% and 51%, respectively). Other sources of awareness included mailings, online ads, and internet searches.

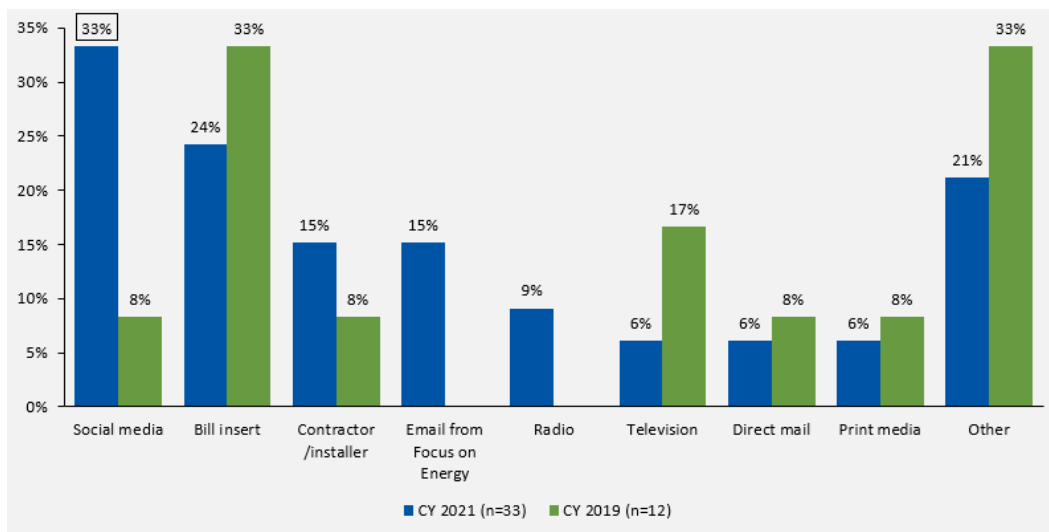
Figure J-13. Sources of Awareness for Renewable Energy Offering



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB7. “Where have you heard about the Focus on Energy’s Renewable Energy Offering?” (total n=107).

Business respondents said that social media (33%) and bill inserts (24%) were the best way to inform the public about offerings (n=33). Social media had the largest change between surveys, with only 8% selecting it in CY 2019 (n=12). Other responses included billboards, family/friends/word-of-mouth, and the Focus on Energy or utility website. Figure J-14 shows the breakdown of responses by year.

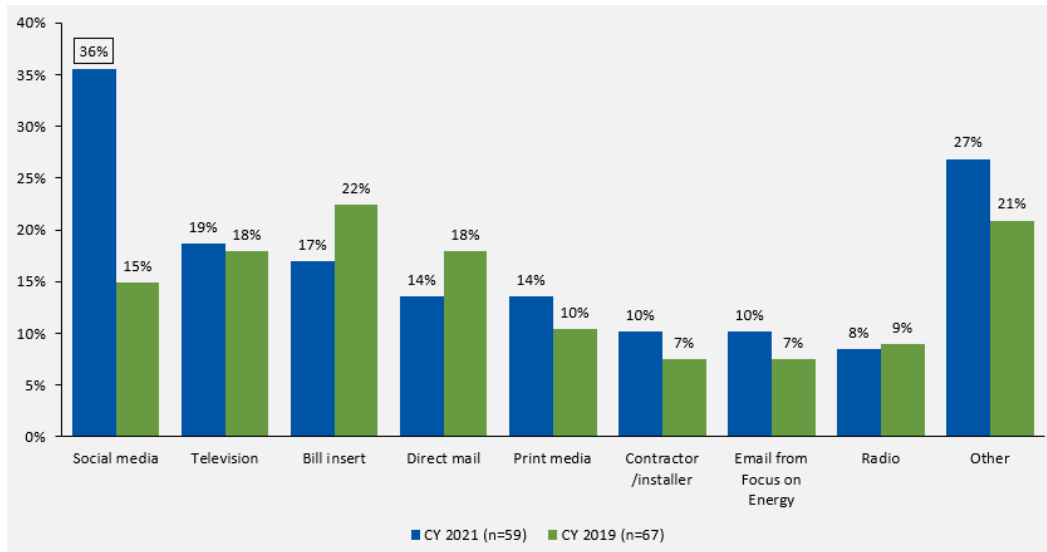
Figure J-14. Best Ways to Inform about Energy Efficiency Offerings (Business Respondents)



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB8. “What do you think is the best way for Focus on Energy to inform the public about energy efficiency offerings?” Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference from CY 2019 result at p<0.05 using a t-test.

Like business respondents, residential respondents indicated social media was the best way to inform the public about offerings (36%, n=59). Also similar to the business responses, social media had the largest change between surveys with only 15% having selected it in 2019 (n=67). Other responses included utilities, other mailings, and energy fairs. Figure J-15 shows the breakdown of responses by year.

Figure J-15. Best Ways to Inform about Energy Efficiency Offerings (Residential Respondents)



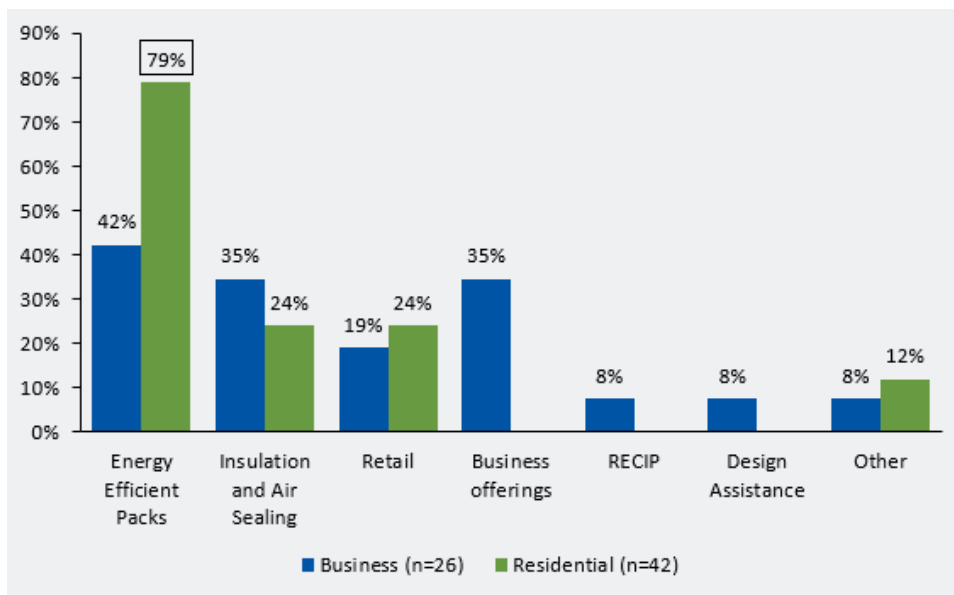
Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB8. “What do you think is the best way for Focus on Energy to inform the public about energy efficiency offerings?”

Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference from CY 2019 result at p<0.05 using a t-test.

Awareness of Other Offerings

Respondents were also asked about their awareness of other Focus on Energy offerings and whether they participated in other offerings. Sixty-four percent of respondents in CY 2021 (n=107) said they were aware of other Focus on Energy offerings, which is the same as in CY 2019 (n=85). As shown in Figure J-16, both business and residential respondents most frequently said they were aware of was the Energy Savings Packs offering (42% and 79%, respectively).

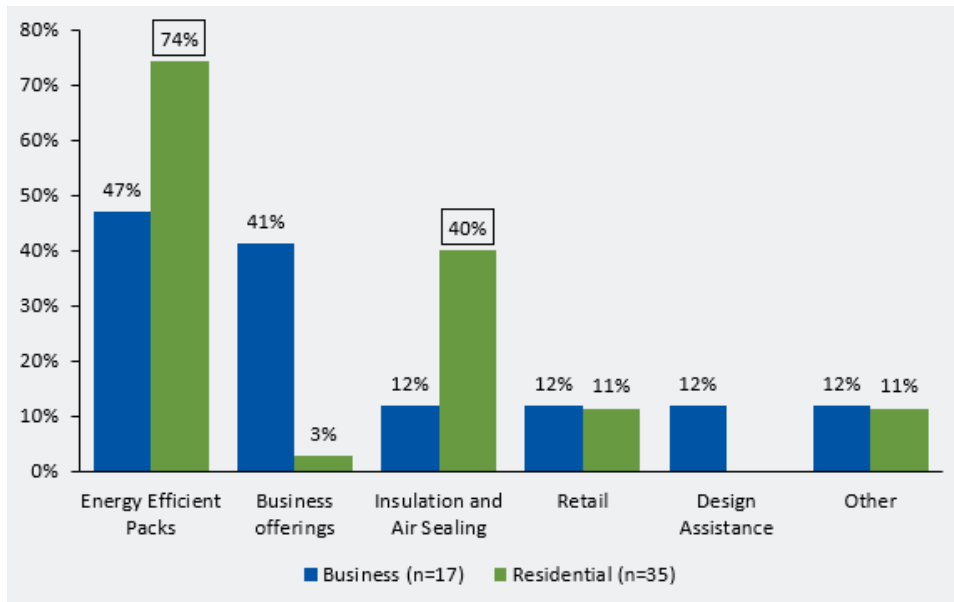
Figure J-16. Awareness of Other Offerings



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB10. “Which offerings or rebates are you aware of?” (total n=68). Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference at p<0.05 using a t-test.

Of the business and residential respondents who were aware of other offerings, 81% (n=67) said they participated in another Focus on Energy offering as an eligible business and/or residential participant. While residential respondents were more likely to have participated in another offering (90%, n=41) than business respondents (65%, n=26), both groups of respondents most frequently participated in the same offering. As shown in Figure J-17, the majority of respondents most frequently reported that they participated in the Energy Efficient Packs offering (47% business respondents and 74% residential respondents), followed by Business offerings among business respondents (41%) and Insulation and Air Sealing among residential respondents (40%).

Figure J-17. Participation in Other Offerings

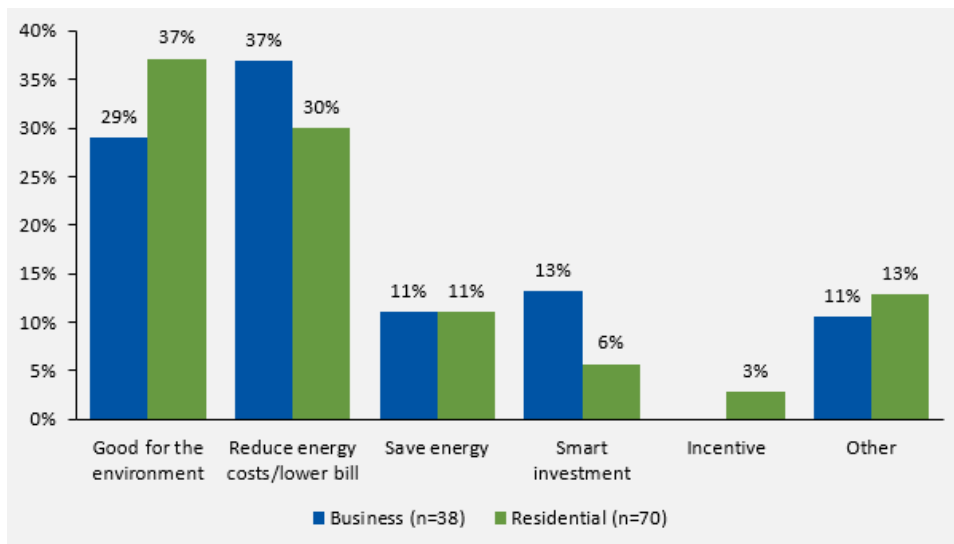


Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB12. “Which offerings have you participated in?” (total n=52). Percentages sum to more than 100% because multiple responses were accepted. Boxes around percentages indicate a statistically significant difference at $p < 0.05$ using a t-test.

Motivation

Respondents were asked what was most important in motivating them to purchase a solar PV system. As shown in Figure J-18, residential respondents most frequently cited environmental benefits (37%), while business respondents most frequently cited reducing energy costs/lowering bills (37%) as their primary motivations for installing solar.

Figure J-18. Motivation to Install Solar PV System

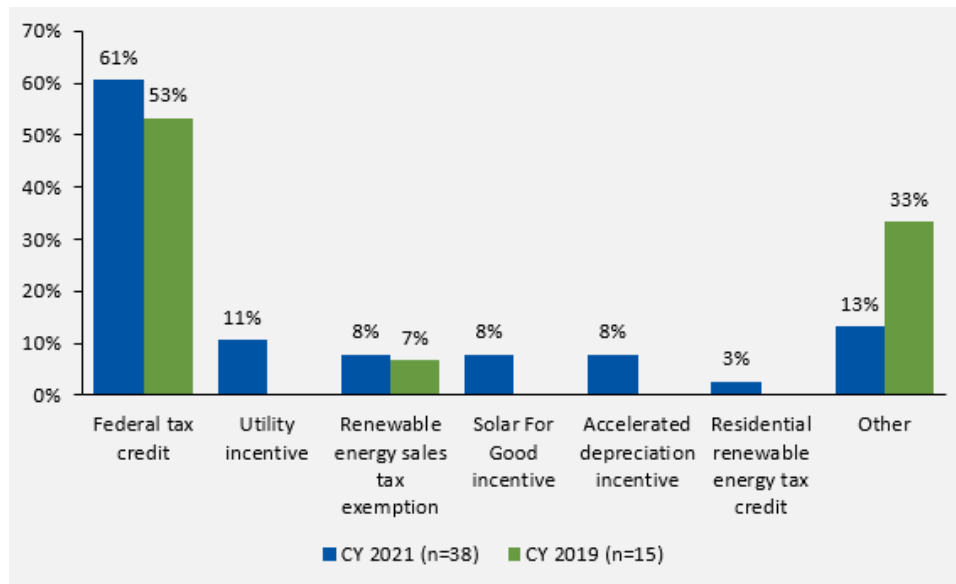


Source: CY 2021 Renewable Energy Offering Participant Survey, Question QB2. “What factor was the most important motivation for you to purchase the new solar PV system?” (total n=108).

Financing

The evaluation team asked respondents questions to understand how customers paid for their new solar PV systems. Among CY 2021 business respondents, other than the Focus on Energy incentive, the most frequently cited additional incentive was the federal tax credit (61%, n=38). Similarly, in CY 2019, business respondents most frequently cited the federal tax credit as an additional incentive (53%, n=15). Figure J-19 shows the breakdown of business respondents by year.

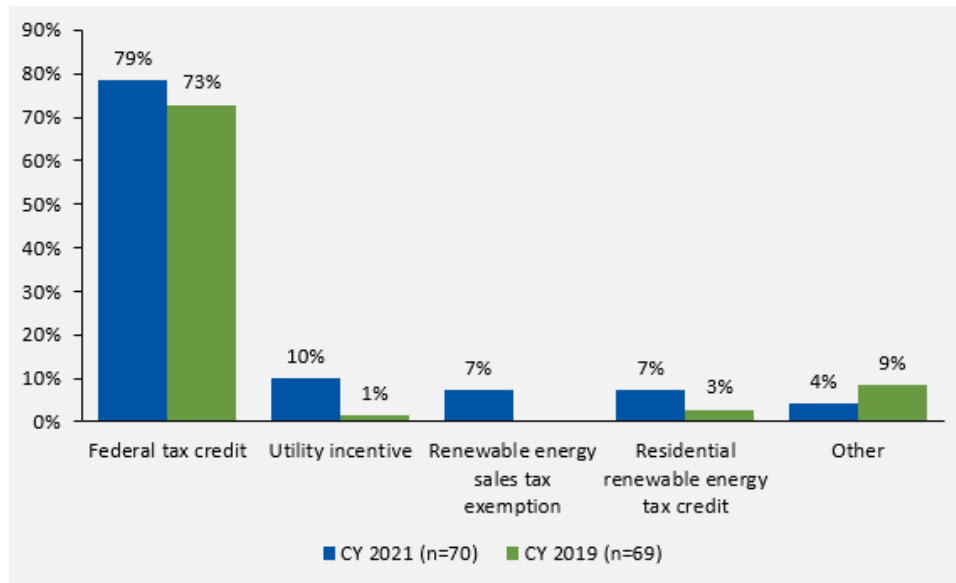
Figure J-19. Other Incentives Received (Business Respondents)



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QE1. “There are a variety of incentives available for solar PV system owners. Other than the Focus on Energy Program rebate that you received, which of the following other incentives did you also receive?”

Among residential respondents, other than the Focus on Energy rebate, the most frequently cited additional incentive was the federal tax credit (79%, n=70), as shown in Figure J-20 This was similar to the results from the CY 2019 survey in which 73% (n=69) of respondents also received the federal tax credit. Unless renewed by Congress, the federal tax credit is set to expire in 2024.

Figure J-20. Other Incentives Received (Residential Respondents)



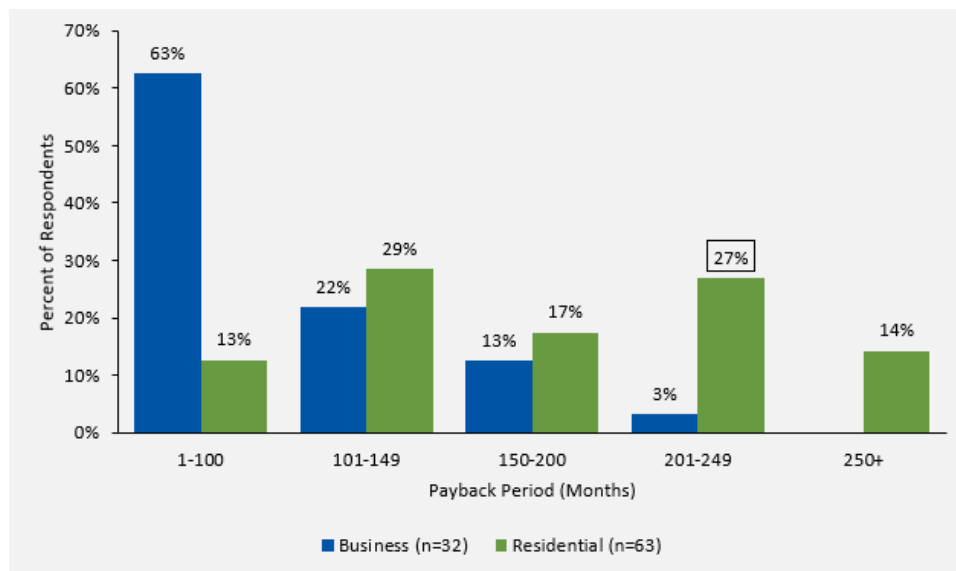
Source: CY 2021 Renewable Energy Offering Participant Survey, Question QE1. “There are a variety of incentives available for solar PV system owners. Other than the Focus on Energy Program rebate that you received, which of the following other incentives did you also receive?” (n=70).

Respondents who reported receiving multiple incentives were asked new questions in CY 2021 to understand how important the combination of incentives was in their decision to install their solar PV system. Sixty-one percent of residential respondents said receiving multiple incentives was *very important* in their decision, while 31% said it was *somewhat important* and 8% said it was *somewhat unimportant* (out of n=59 receiving multiple incentives). Seventy-seven percent of business respondents said it was *very important* in their decision, while 23% said it was *somewhat important* (n=30).

Additionally, 29% of residential respondents (n=55) and 19% of business respondents (n=27) said they would have completed the same solar PV project if they had not received multiple incentives. Overall, 40% of residential respondents said they were *very satisfied* with the total dollar amount of the incentives and tax credits they received, while 49% said they were *somewhat satisfied* (n=67). Fifty percent of business respondents said they were *very satisfied* with their incentive amount, while another 42% said they were *somewhat satisfied* (n=38).

Respondents were also asked about the length of their payback period for their solar PV system. As shown in Figure J-21, the most common ranges of payback period length for business respondents were between 1-100 months (63%) and 101-149 months (22%) while the most common among residential respondents were 101-149 months (29%) and 201-249 months (27%). When asked how important the length of the payback period was in their decision to install their system, 45% of business respondents said it was *very important* and 37% said it was *somewhat important* (n=38). On the residential side, 30% of respondents said it was *very important* and 36% said it was *somewhat important* (n=70).

Figure J-21. Length of Payback Period (in Months)



Source: CY 2021 Renewable Energy Offering Participant Survey, Question QE6. “How long was the payback period for your solar PV system? – Length of payback period in months” (n=95).

Boxes around percentages indicate a statistically significant difference at $p < 0.05$ using a t-test.

System Operability

Respondents were asked questions relating to how their system was operating. Eighty-six percent of respondents said they had not experienced any unscheduled maintenance or downtime on their system since it was installed (n=108). Respondents who did experience problems reported issues with the PV modules, array wiring, DC optimizer, inverters, monitoring system, and other parts.

Customers who experienced issues were asked how long their systems experienced downtime. On the business side, one customer said their system was inoperable for less than one hour, two respondents said their systems were inoperable for multiple days (four and 7 respectively), and one respondent said three months. On the residential side, one respondent said their system was inoperable for two hours, five said their system was inoperable for multiple days ranging from two to 25, two respondents said one month, and one respondent said their system was down for six months. Three of the four business respondents and all 11 residential respondents that reported issues said that their system was back up and running at the time of the survey.

Suggestions for Improvement

At the end of the survey, respondents were asked for additional feedback regarding the Renewable Energy Offering. Seventy-eight percent of respondents had either no feedback or positive feedback. Feedback from the other 22% of respondents is categorized as follows:

- **Higher incentive level (n=9)**
- **Installation process (n=7):** respondents reported issues with installation requirements, inspections, and delays.

- **Better communication (n=5):** respondents suggested more advertisements to inform more customers (especially agriculture owners as noted by one respondent) and better communication about available technology offerings (notably battery storage and battery options).
- **Additional offerings (n=3):** respondents suggested electric vehicle chargers and geothermal offerings.

Building Characteristics and Demographics

Lastly, participants were asked questions about their home or building. As shown in Figure J-22 just over half of business respondents have electric water heating, while Figure J-23 shows that most residential customers have natural gas water heating.

Figure J-22. Business Water Heating

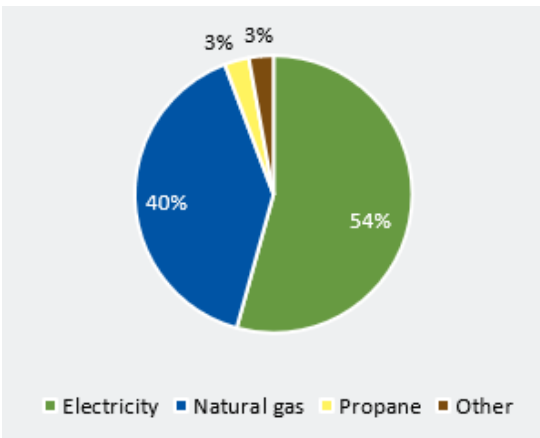
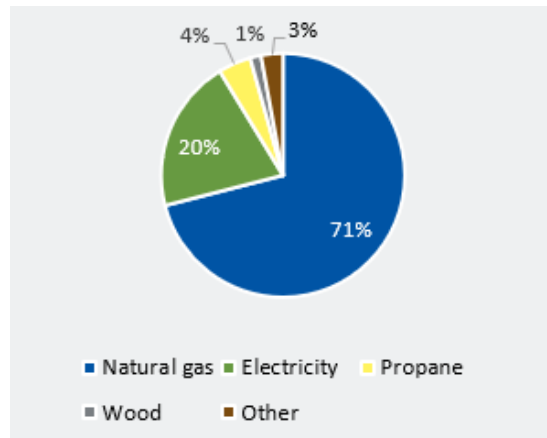


Figure J-23. Residential Water Heating



Source: CY 2021 Renewable Energy Offering Participant Survey, Question Q11. “What type of fuel does the water heater use where you installed the solar PV system?” (total n=104).

Figure J-24 and Figure J-25 show space heating fuels for businesses and residential participants. Natural gas was most prevalent in both sectors (46% and 71%, respectively).

Figure J-24. Business Space Heating

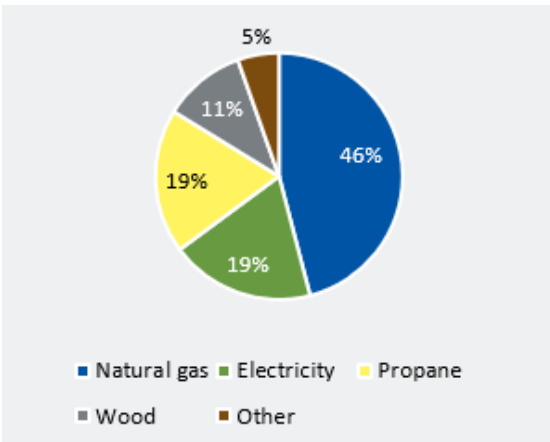
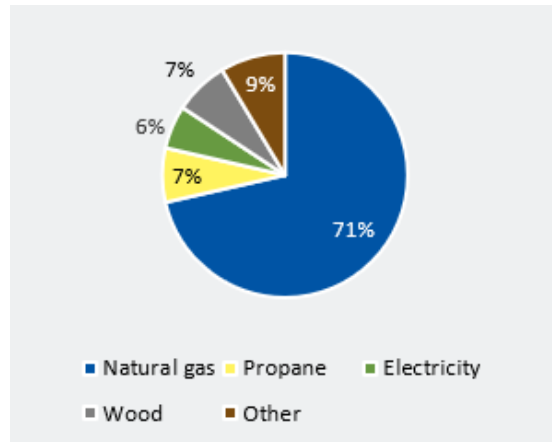


Figure J-25. Residential Space Heating



Source: CY 2021 Renewable Energy Offering Participant Survey, Question Q12. “What type of fuel do you primarily use for space heating where you installed the solar PV system?” (total n=107).

Most residential respondents reported living in single-family detached houses (97%, n=70), followed by attached townhouses, row houses, or duplexes (3%). All residential respondents said they own their homes. Most business respondents (32%, n=38) reported the primary building use where their system was installed is agricultural, followed by factory/manufacturing (13%) or some other type of building (18%). Eighty-nine percent of these same business respondents said they own the building where their system was installed, while 3% said they rent and 8% have a mix of owning and renting.

Residential participants reported the level of school they had completed and household income (n=70). Most respondents said they had completed a graduate or professional degree (37%) or bachelor’s degree (31%). These percentages are higher than the state average of 10% of people who have completed a graduate or professional degree and 30% who have completed a bachelor’s degree.⁵⁸

Participants also reported their household’s level of income in CY 2020 before taxes. The highest percentage of respondents said their household income in CY 2020 was between \$100,000 and \$149,000 (33%), followed by \$20,000 to \$49,000 (20%) and \$200,000 or more (15%). According to census data, the highest percentage of Wisconsin residents have household incomes between \$50,000 to \$74,999 (19%), \$100,000 to \$149,999 (16%), and \$75,000 to \$99,999 (14%).⁵⁹

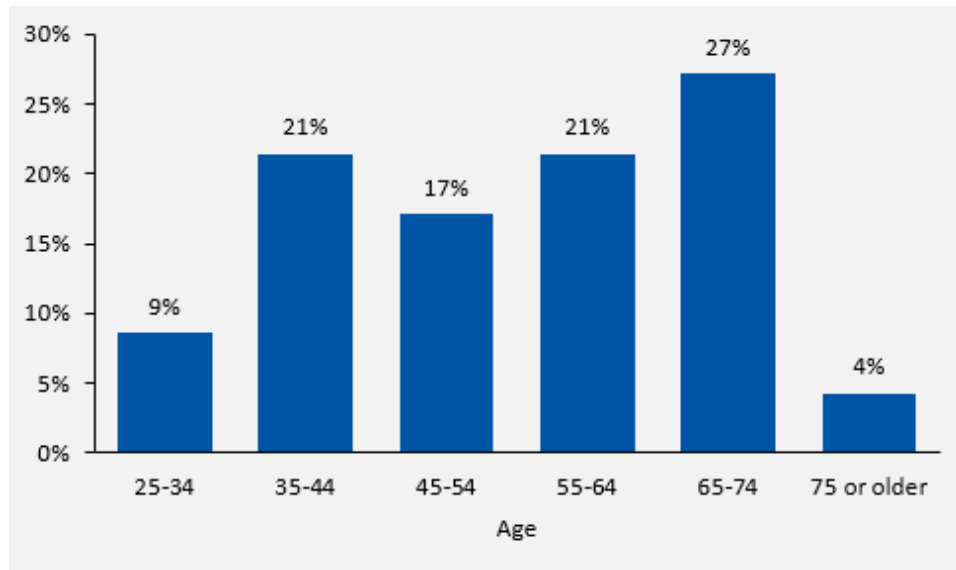
Finally, residential respondents were asked to report their age (n=70). As shown in Figure J-26, the highest percentage of respondents said they were between 65 and 74 years old (27%), followed by the

⁵⁸ Source: 2019 ACS census data. <https://data.census.gov/cedsci/table?tid=ACSDP5Y2019.DP02&g=0400000US55>

⁵⁹ Ibid.

age groups of 35 to 44 and 55 to 64 years old (21% each). By comparison, the highest percentage of Wisconsin residents are between 45 to 54 years (13%), 25 to 34 years (13%), and 35 to 44 years (12%).⁶⁰

Figure J-26. Residential Respondent Ages



Source: CY 2021 Renewable Energy Offering Participant Survey, Question Q10. “Which of the following categories best represents your age?” (n=70).

Trade Ally Experience

To understand how trade allies are interacting with the Renewable Energy Offering, the evaluation team conducted in-depth interviews with 11 trade allies in fall 2021. The team contacted respondents from a population of 67 trade allies with phone numbers on file. Though the sample primarily comprised trade allies who completed residential jobs, the evaluation team prioritized outreach to trade allies who also completed business jobs to understand if there were any notable differences. The team stratified trade allies into different tiers based on the number of jobs they completed, speaking to four trade allies who completed between 1 and 10 jobs, four who completed between 11 and 50 jobs, and three who completed 50 or more jobs.

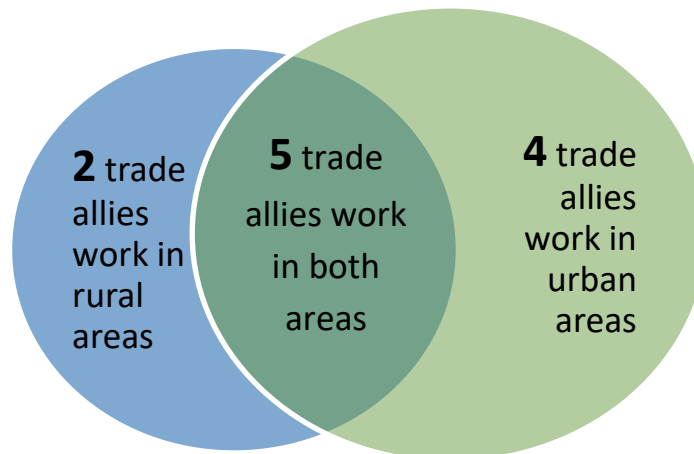
The purpose of the interviews was to learn what aspects of the offering worked well for trade allies and identify potential areas for improvement. The interviews focused on three specific areas of trade ally interaction with the offering: recruitment and satisfaction, marketing, and customer and trade ally experience.

⁶⁰ Source: 2019 ACS census data.
<https://data.census.gov/cedsci/table?tid=ACSDP5Y2019.DP05&g=0400000US55>

Recruitment and Satisfaction

As illustrated in Figure J-27, five trade allies said their work was evenly split between urban and rural areas, while four said they primarily work in urban areas and two said they primarily work in rural areas. Eight of the 11 trade allies said most of the work their company completes receives a Focus on Energy incentive. The other three trade allies said this was not the case for their companies because they do work other than solar, but they added that most of their solar work goes through the Renewable Energy Offering.

Figure J-27. Trade Ally Work Areas



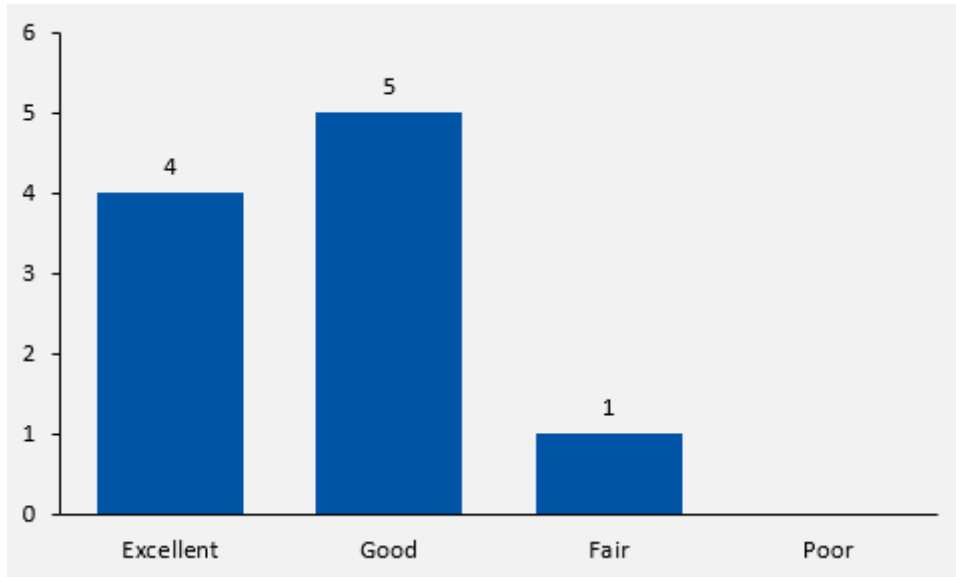
Seven trade allies were participating contractors for three or more years. The team asked the trade allies who were participating contractors for less than three years how they heard about the offering and what motivated them to join. All four of these trade allies said they heard about the offering through their work in the industry and had joined to expand their business or stay competitive. Nine trade allies said the offering had positively impacted their businesses, while the other two said the offering had a minimal, but not negative, impact on their businesses.

Trade allies were asked to rate Focus on Energy as *excellent*, *good*, *fair*, or *poor* on certain components of offering implementation, specifically how effective the offering was at the following:

- Notifying trade allies about operational and incentive changes
- Making the paperwork easy to submit
- Providing trade allies with tools and resources to effectively market offerings to customers
- Providing educational opportunities or training resources
- Providing the right amount of support

As shown in Figure J-28, most trade allies reported that the offering was doing a *good* or *excellent* job with outreach and sharing updates about the offerings. The one trade ally who rated outreach and offering notifications as *fair* said they were surprised when Focus on Energy introduced changes and that the changes could have been communicated with more advance notice.

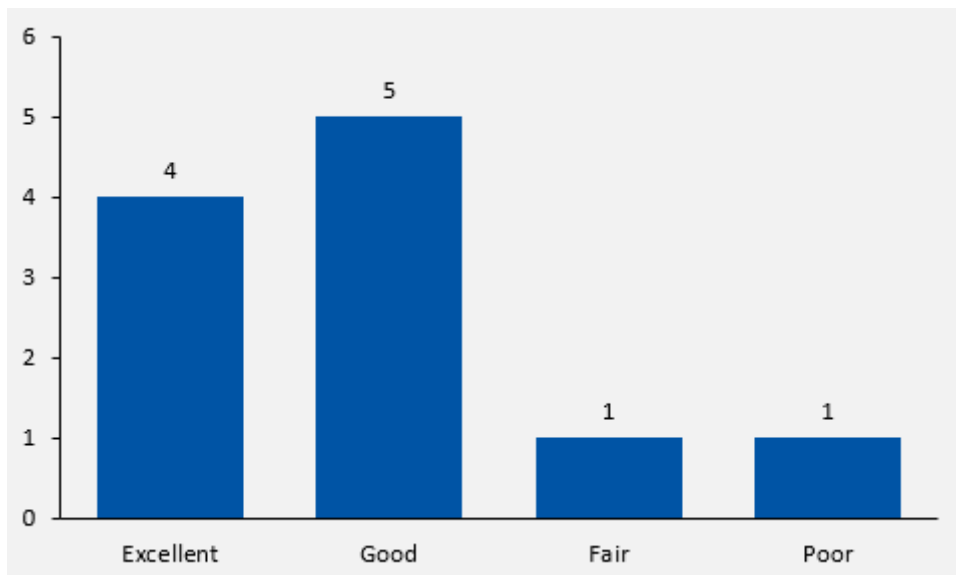
Figure J-28. Trade Ally Opinion on Outreach and Offering Notifications from Focus on Energy



Source: Renewable Energy Offering Trade Ally Interview Question Q17.1: “How would you say Focus on Energy is doing when it comes to reaching out to you and keeping you informed about operational and incentive changes?”

When asked if Focus on Energy made it easy to submit paperwork, most trade allies said Focus on Energy was doing an *excellent* or *good* job (Figure J-29). The trade ally who said Focus on Energy was doing a *poor* job was unclear about the expected documentation, stating: “After every submission, [Focus on Energy] always asks for something different that was not asked for in the initial application and it ends up being some form of document that we do not have.”

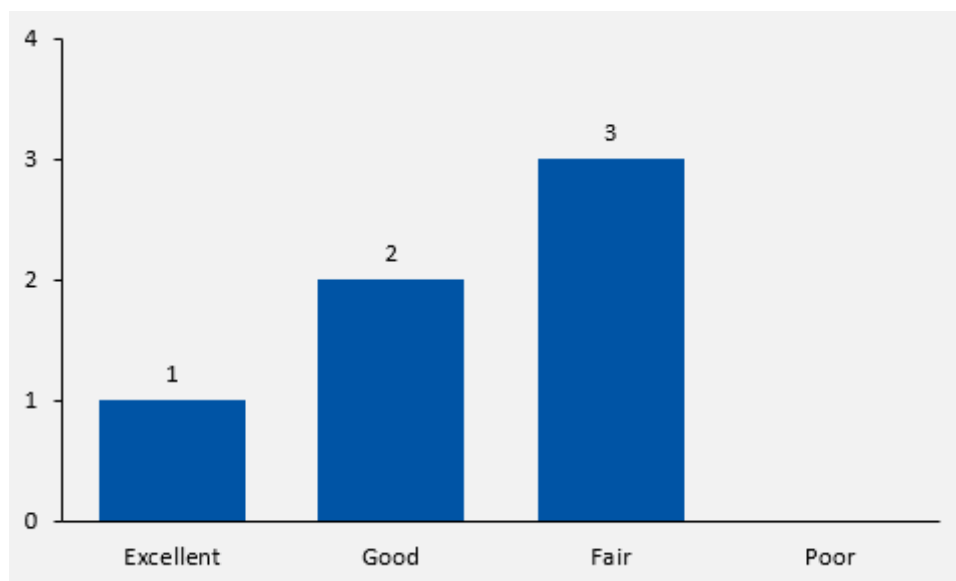
Figure J-29. Trade Ally Opinion on Ease of Submitting Paperwork



Source: Renewable Energy Offering Trade Ally Interview Question Q17.2: “How would you say Focus on Energy is doing when it comes to making the paperwork easy to submit?”

Trade allies were asked how they thought Focus on Energy was doing when it came to providing them with tools and resources to be used for marketing the offering to their customers. Five trade allies did not answer because they did not need additional marketing materials. As shown in Figure J-30, of those who did respond, three said Focus on Energy was doing a *good* or *excellent* job. The other three said Focus on Energy was doing a *fair* job, and of those, two said that Focus on Energy did not provide many marketing materials and it would be helpful to have better resources for customers. The other trade ally did not think spending money on additional marketing was worth it based on their business needs at the time of the interview. The evaluation team found no correlation between the number of jobs completed by trade allies and their use of marketing materials, indicating trade allies at all levels of participation use different marketing strategies.

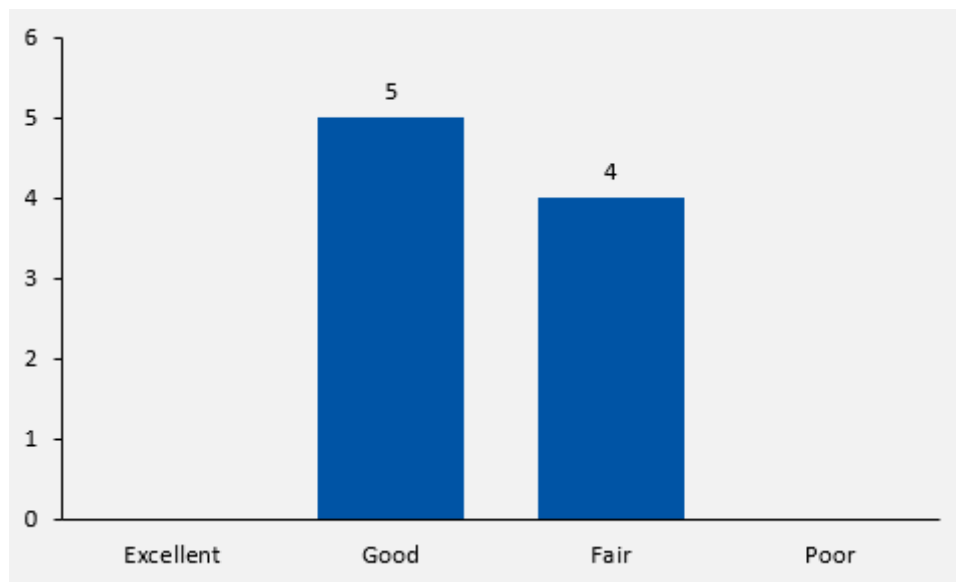
Figure J-30. Trade Ally Opinion on Marketing Tools and Resources



Source: Renewable Energy Offering Trade Ally Interview Question Q17.3: “How would you say Focus on Energy is doing when it comes to providing you with tools and resources to effectively market offerings to your customers?”

Figure J-31 shows trade ally opinion about how well Focus on Energy provides educational opportunities or training resources. Five trade allies said Focus on Energy did a *good* job on education and training, four said Focus on Energy was doing a *fair* job. Of the trade allies who said Focus on Energy is doing a *fair* job, one said that the Renewable Energy Offering does not provide as much educational material as other offerings. Another said they felt the opportunities that Focus on Energy provides are more like information sessions than educational opportunities and wished they could be improved upon.

Figure J-31. Trade Ally Opinion on Education and Training Resources

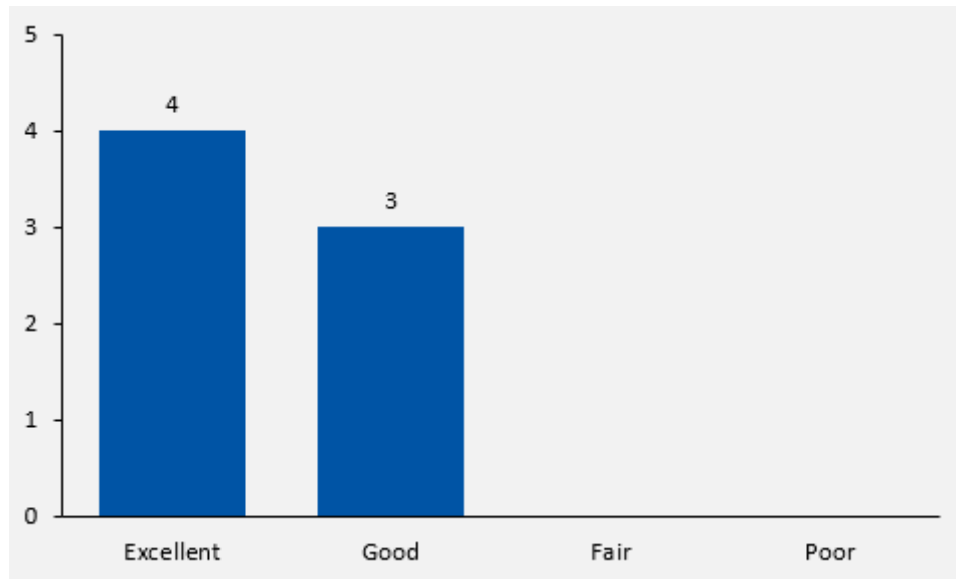


Source: Renewable Energy Offering Trade Ally Interview Question Q17.4: “How would you say Focus on Energy is doing when it comes to providing educational opportunities or training resources?”

Trade allies were also asked about the usefulness of trainings available through the offering. Of the four who had attended technical trainings or trade ally forums held by Focus on Energy, three said the trainings and forums were useful. On the other hand, one trade ally said the training they attended “tried to cover too much and did not go in depth.” Five trade allies also offered suggestions for additional trainings or areas of support, including more training on general industry information, microgrid/solar plus storage, battery storage, customer education, and interconnection studies.

When asked if Focus on Energy gave the right amount of support so they could confidently sell and install solar PV systems, seven trade allies said Focus on Energy was doing an *excellent* or *good* job, as shown in Figure J-32. None of the trade allies said they felt Focus on Energy was doing a *fair* or *poor* job. 4 trade allies said this question was not applicable to them because they do not use support provided by Focus on Energy as they operate in a self-sufficient manner.

Figure J-32. Trade Ally Opinion on Support Provided by Focus on Energy



Source: Renewable Energy Offering Trade Ally Interview Question Q17.5: “How would you say Focus on Energy is doing when it comes to providing the right amount of support so you can confidently sell and install solar PV systems?”

When asked about changes made to the incentives offered through the Renewable Energy Offering, 10 trade allies said they did not notice a change in customers sales or demand because of the change to the solar PV incentive in CY 2020. One trade ally was frustrated with the change, stating: “Customers were promised one thing and then given another. Although it was a small amount for customers, they were annoyed about the changes.”

Trade allies were also asked how well the current incentive from Focus on Energy motivates customers to participate. Six trade allies said the incentive has some effect on customers’ motivation to install solar. The other five trade allies reported that the incentive does little to motivate customers, but it does not hurt. These trade allies said most customers already plan to install solar and the incentive is just a bonus to them. Additionally, the evaluation team asked trade allies if they believed their business would be able to install more systems if the offering increased incentives. Ten trade allies said they believed this would be possible, while one said they were not currently looking to grow.

Marketing and Promotion

When asked how they typically acquire new customers to participate in the offering, trade allies most frequently said word of mouth (eight respondents) and online advertising (six respondents). Ten trade allies also said they frequently promote the Focus on Energy incentive to customers, and 10 trade allies said they promote federal tax credits for solar alongside the Focus incentive to ensure their customers receive as many incentives as possible.

Nine trade allies said they do not use any marketing materials provided by Focus on Energy. The two trade allies who said they did use marketing materials said they use infographics and links to the Focus on Energy website to help inform customers. When asked if they had any suggestions on what

marketing materials would be helpful to include, two trade allies said having a published list of installers in a customer’s area, along with a satisfaction rate to establish legitimacy, would be helpful. Two other trade allies said having more general marketing materials to promote available incentives and educational information would be helpful to their customers.

The evaluation team also asked trade allies what their most common marketing messages were when promoting the Renewable Energy Offering. Five Trade Allies said financial savings and three said environmental benefits were their most common messages to customers.

Barriers to Participation in Offering

When asked what factors they believe make customers hesitate to install solar PV systems, beyond cost, five trade allies said that the length of payback/return on investment is a common barrier. Four trade allies also identified location challenges, such as solar PV system placement and dealing with shade as a barrier for participation. Trade allies also reported barriers such as roof structural issues (three respondents), lack of knowledge among customers (three respondents), and aesthetic concerns (three respondents).

The evaluation team also asked trade allies about effects that the COVID-19 pandemic had on participation in the Renewable Energy Offering. Nine trade allies said they had changed their businesses or customer interactions due to COVID-19, including things like incorporating more virtual offerings and interactions and updating safety protocols.

When asked about staffing and handling of customer demand, nine trade allies said their companies were in a good position to handle the current level of customer demand. The two trade allies who did not think they were in a good position to handle current customer demand said they were managing it with their current level of staffing, with one adding that they were not interested in growing. The other three trade allies interested in growing their business said they look for employees who are already trained in the solar field but are willing to train new industry hires. Additionally, one trade ally said that if Focus on Energy promoted the solar industry as a career path, this could help them find qualified staff.

Appendix K. Residential General Population Survey Findings

During the winter of CY 2021, the evaluation team conducted a multimode (web-based and telephone) survey of Wisconsin residents, including people who had and had not participated in Focus on Energy offerings. An enhancement added this year was to identify and differentiate limited-income respondents where possible. Objectives of the study were to determine the following:

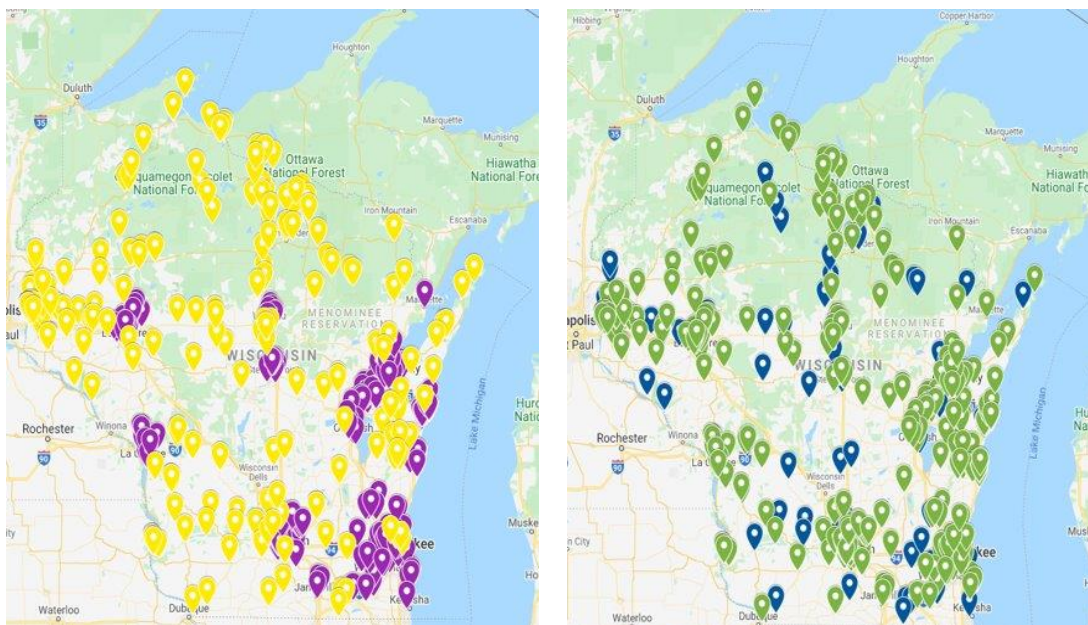
- Differences between limited-income and non-limited-income respondents
- General awareness of and participation in Focus on Energy offerings
- Perception of Focus on Energy and energy efficiency
- Barriers to participation and best ways to inform customers about Focus on Energy
- Prevalence of smart devices in Wisconsin homes
- Impact of COVID-19 pandemic on energy use and energy efficiency upgrades

Participant Sampling

Large utilities across the state provided the evaluation team with either samples or full lists of their residential customers. As shown in Figure K-1, by spreading the sample geographically across rural and urban locales and adjusting to ensure equal proportion of the sample by utility, the evaluation team developed a random sample of 64,466 residents for the general population survey (from a population of over half a million).

Figure K-1. Geographic Breakdown of the Sample

Purple: Urban (66%), Yellow: Rural (34%) Green: Gen Pop (73%), Blue: Limited Income (27%)



The evaluation team assumed a quarter of respondents would identify as limited-income respondents, and 27.5% of the respondents did so (181 out of 658 residents who completed the survey). Table K-1

shows the sample frame and completed surveys by mode. The web survey was offered in English and Spanish, but only two respondents used the Spanish version.

Table K-1. Sample Information

Mode	Sample Frame	Completes	% of Total
Web	57,441	653	>99%
Phone	7,025	5	<1%
Total	64,466	658	100%

Survey Findings

The survey findings are presented as either the entire population or by comparing limited-income respondents to non-limited-income respondents. Limited-income is defined as those respondents that qualify for Tier 2 incentives in the Trade Ally Solutions, as show in Table K-2. When appropriate, survey responses are also compared to the last general population survey fielded in CY 2018. It is important to note that the CY 2018 survey was fielded via phone whereas this iteration was performed primarily via web, so some differences in responses may be due to the survey mode.

Table K-2. Tier 2 Qualifying Income Levels Based on Household Size

Household Size	Annual Income 80% SMI	1 Month Income 80% SMI
1	\$39,841	\$3,320
2	\$52,101	\$4,342
3	\$64,360	\$5,363
4	\$76,619	\$6,385
5	\$88,877	\$7,406
6	\$101,136	\$8,428
7	\$103,435	\$8,620
8	\$105,733	\$8,811
9	\$108,031	\$9,003
10	\$110,331	\$9,194
11	\$112,629	\$9,385

Source: <https://www.focusonenergy.com/income>

Awareness

The evaluation team asked respondents if they were aware of Focus on Energy before they received the survey. A majority of overall respondents (83%, 523 of 630) said they were aware of Focus on Energy. This is a statistically significant increase in awareness compared to the last general population survey

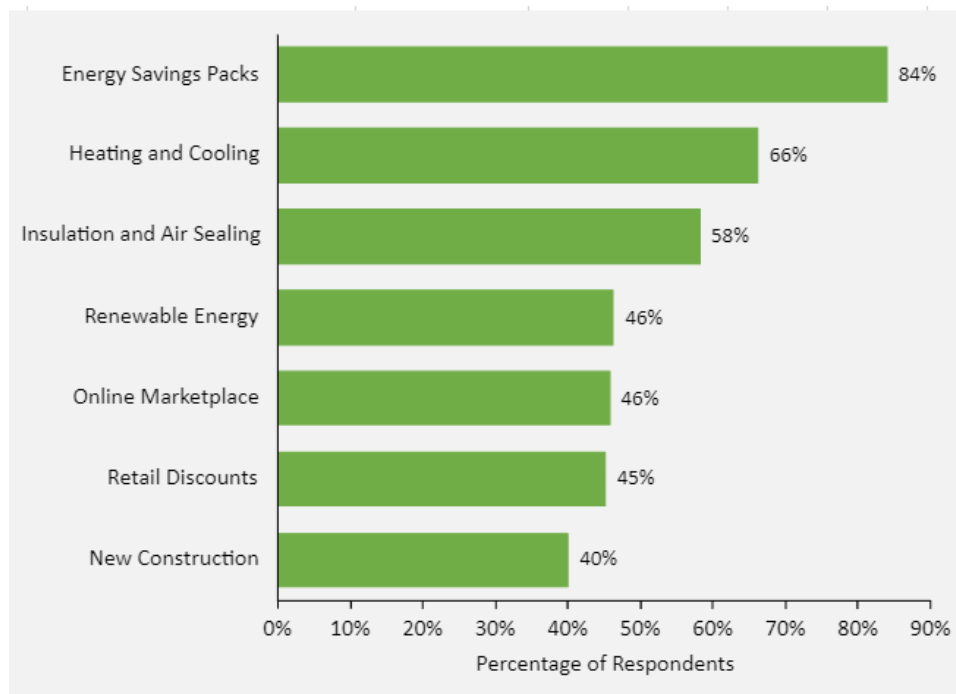
that was fielded in CY 2018,⁶¹ which found that 48% (n=297) of respondents were aware of Focus on Energy. Similarly, most (76%, n=181) limited-income respondents were aware of Focus on Energy.

Previous Participation

Of the CY 2021 survey respondents who reported being aware of Focus on Energy, 81% of limited-income respondents (n=131) and 82% of non-limited income respondents (n=352) had previously participated in a Focus on Energy offering. This is a significant increase from CY 2018, where only 45% of respondents (n=139) had previously participated in a Focus on Energy offering.

As shown in Figure K-2, the most common offerings were Energy Savings Packs, Heating and Cooling, and Insulation and Air Sealing. Responses from limited-income respondents did not differ from the full population.

Figure K-2. Participation in Focus on Energy Programs (All Respondents)



Source: General Population Survey Question C6. “What Focus on Energy offerings did you participate in?” Multiple responses allowed (n=523)

Rural Programs

Roughly a third (224 of 658) of survey respondents lived in designated rural zip codes and were eligible for Focus on Energy’s rural offerings. The evaluation team asked this subset of respondents if they were aware that Focus on Energy had special offerings for customers in their area. A quarter (38 of 166 of the

⁶¹ Tested at the 90% confidence level, better than p=0.05.

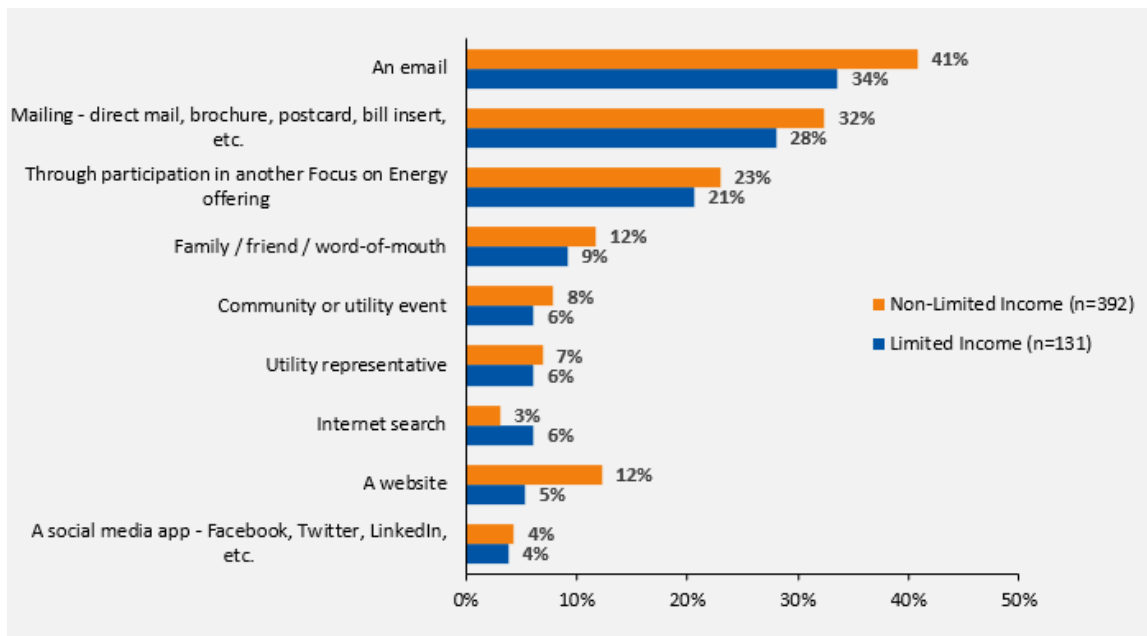
rural respondents who answered this question) said they were aware that Focus on Energy offered a special solar PV bonus in their area.

Awareness Channels

The evaluation team asked the 523 respondents who were aware of Focus on Energy before the survey how they had heard about Focus on Energy. The most common way respondents heard about Focus on Energy was by email (34% of limited-income; 41% of non-limited-income). This differs from the CY 2018 results, where 47% said they heard about Focus on Energy through utility bill inserts.

As shown in Figure K-3, other frequent responses included mailing (28% limited-income; 32% non-limited-income) and through participation in another Focus on Energy offering (21% limited-income; 23% non-limited-income).

Figure K-3. How Respondents Learned about Focus on Energy



Source: General Population Survey Question C8. “How have you heard about Focus on Energy’s programs?” Multiple responses allowed (n=523)

The evaluation team asked all respondents about the best way for Focus on Energy to inform them about available incentives and programs. The most frequent responses (for all groups combined) were an email from Focus on Energy (59% of respondents), Focus on Energy mailing (30%), and utility bill insert (28% of respondents). This differs slightly from the CY 2018 phone survey results, where 38% of respondents said Focus on Energy mailing was the best way to inform them about available incentives and programs. In CY 2018, the top three sources of information were the same as in CY 2021.

Respondents were also asked what they considered trusted sources of energy efficiency information. Limited-income respondents (28%) reported the Focus on Energy website specifically as the top trusted

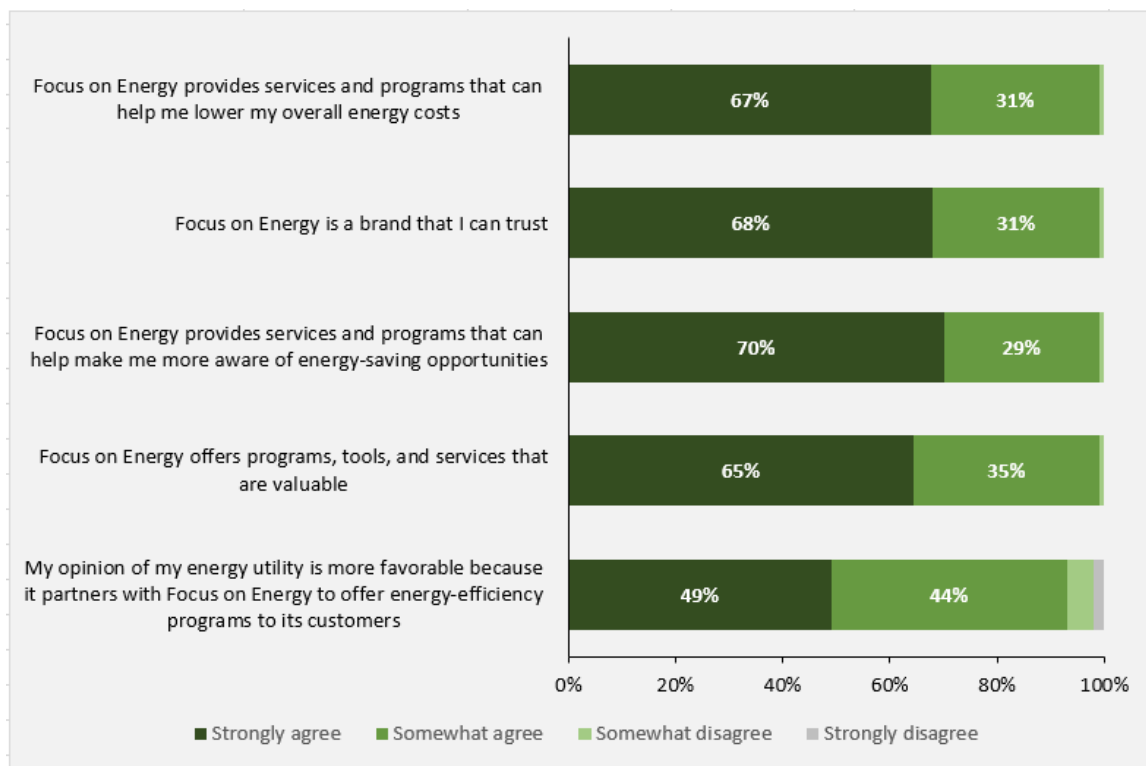
source, while non-limited-income respondents (37%) reported energy-related websites in general. Both options were in the top three responses for both respondent groups.

Brand Affinity

The evaluation team asked the respondents who were aware of Focus on Energy prior to the survey how strongly they agreed or disagreed with several statements about Focus on Energy. As shown in Figure K-4, respondents mostly agreed with all statements, and nearly 100% of respondents reporting they *strongly agree* or *somewhat agree* with statements about Focus on Energy helping lowering energy costs, being a trusted brand, and increasing energy-savings awareness.

The statement with the lowest level of agreement was, “My opinion of my energy utility is more favorable because it partners with Focus on Energy to offer energy-efficiency programs to its customers” (49% *strongly agree*, 44% *somewhat agree*, 5% *somewhat disagree*, and 2% *strongly disagree*). Although this statement had the lowest level of agreement across the respondents in CY 2018 as well, the overall responses indicate that partnering with Focus on Energy is beneficial for public perception.

Figure K-4. Agreement Level with Statements about Focus on Energy



Source: General Population Survey Questions D1–D5. “Please indicate whether you agree or disagree with these statements.”

Participation Barriers and Motivations

The evaluation team asked respondents about the biggest challenge in completing energy efficiency improvements. The most common challenge reported by all respondents was upfront costs (51% of

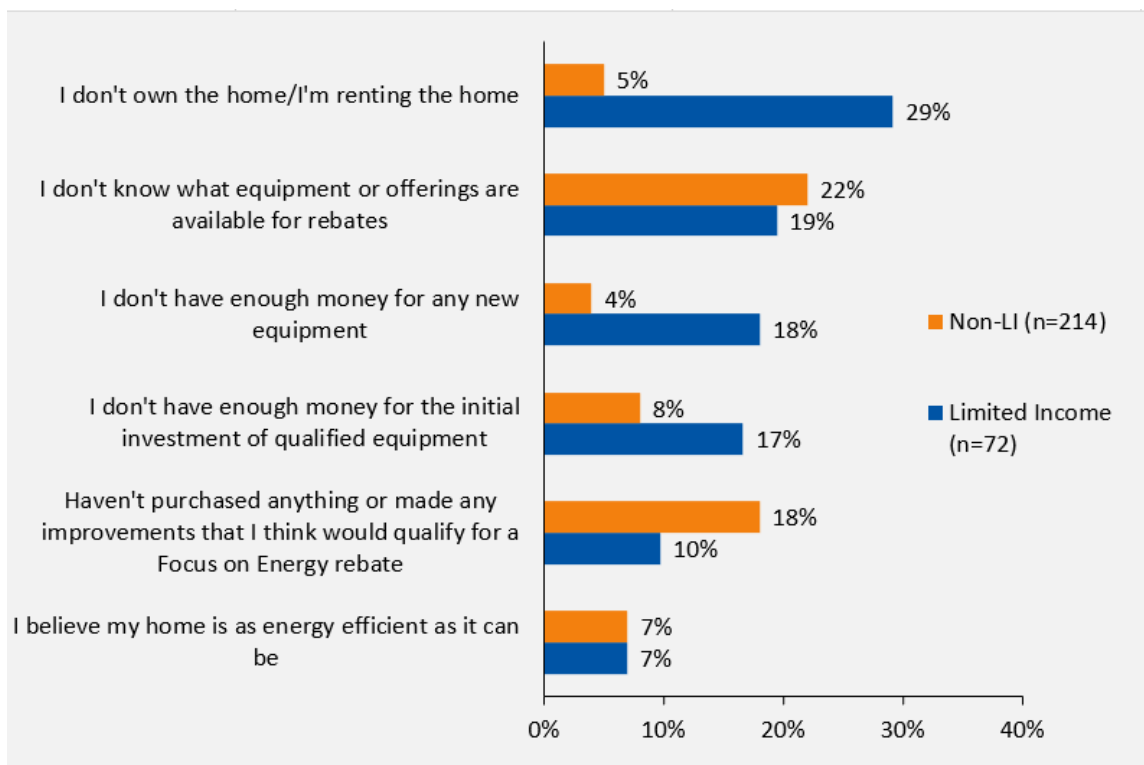
respondents). This is similar to the CY 2018 results, where 56% said upfront cost was the biggest challenge.

Respondents who said they were aware of Focus on Energy prior to the survey but had not participated in a Focus on Energy offering were asked why they had not. As shown in Figure K-5, challenges for limited-income and non-limited-income groups diverged in a few areas:

- For limited-income respondents, the most frequent responses were not owning the home (29%), being unaware of what equipment or offerings were available for rebates (19%), and not having enough money for any new equipment (18%).
- For non-limited income respondents, the most frequent responses were being unaware of what equipment or offerings were available for rebates (22%), had not purchased anything or made any improvements that they believe would qualify for a Focus on Energy rebate (18%), and upfront costs of qualified equipment (8%).

Although 51% of all respondents said the most common challenge in completing energy efficiency improvements was upfront costs, when asked why they had not participated in a Focus on Energy offering, only 17% of limited-income and 8% of non-limited-income respondents said it was because of a lack of resources for the initial investment.

Figure K-5. Reasons for Nonparticipation



Source: General Population Survey Question E4. What are the reasons you have not participated in a Focus on Energy program? (n=214, n=72)

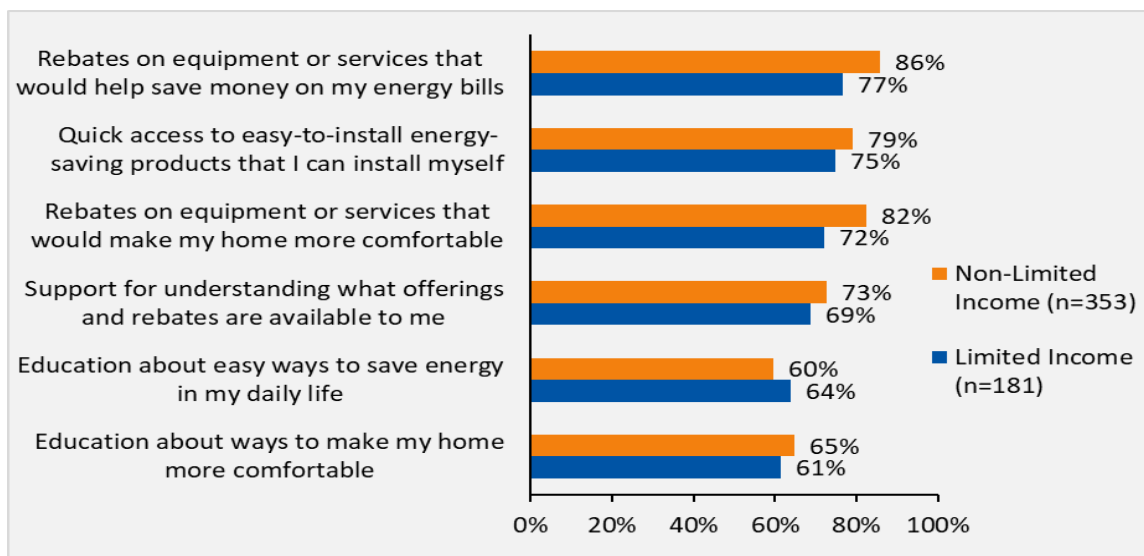
Limited-income respondents (n=181) and non-limited-income respondents (n=353) reported similar levels of agreement on the importance (7 or higher on a 0-to-10-point scale) of energy efficiency improvements for:

- Making sure the home is a safe and healthy environment (94% LI vs. 92% non-LI),
- Reducing energy bills (95% LI vs. 90% non-LI),
- Maximizing the comfort of the home (87% LI vs. 88% non-LI), and
- Reducing their impact on the environment (75% LI vs. 76% non-LI).

During hot summer months and cold winter months, limited-income respondents are more likely to think their utility bills are big financial burdens (61%) than non-limited-income respondents (26%). This difference is statistically significant.

Limited-income and non-limited-income respondents reported similar levels of agreement when asked how helpful the following Focus on Energy services would be to them. Figure K-6 shows the top six responses across limited-income respondents (n=181) and non-limited-income respondents (n=353). The respondents were then asked how likely they would be to participate in Focus on Energy services if they were to meet their needs. Of the limited-income respondents (n=181), 65% said that they would be likely to participate. Of the non-limited income respondents (n=353), 82% said that they would be likely to participate. This difference between limited-income and non-limited income respondents is statistically significant.

Figure K-6. Helpfulness of Focus on Energy Services



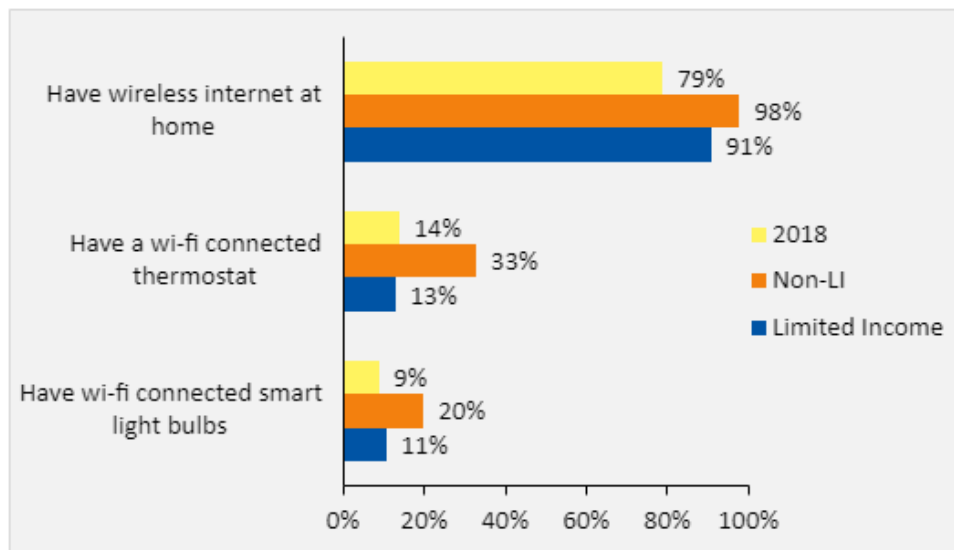
Source: General Population Survey Question F7. How helpful would the following Focus on Energy services be to you? Use a scale from 0-10, with 0 being "not at all helpful" and 10 being "extremely helpful." (n=534)

Smart Device Saturation

Ninety-one percent of limited-income respondents and 98% of non-limited-income respondents said they have wireless internet at home, a significant increase from 79% in the CY 2018 phone survey. Ninety-three percent of rural respondents and 95% of urban respondents said they had Wi-Fi access.

The evaluation team asked respondents what smart devices were in their homes. Figure K-7 shows that 13% of limited-income respondents and 33% of non-limited-income respondents have a Wi-Fi–connected thermostat, a significant increase from 14% in CY 2018. Eleven percent of limited-income respondents and 20% of non-limited-income respondents said they have Wi-Fi–connected smart light bulbs at home, a significant increase from 9% in CY 2018 among the general population. Of all respondents, 60% have a smart television, 34% have a smart speaker, 15% have smart home security, and 15% have a video doorbell.

Figure K-7. Prevalence of Wi-Fi Connected Devices

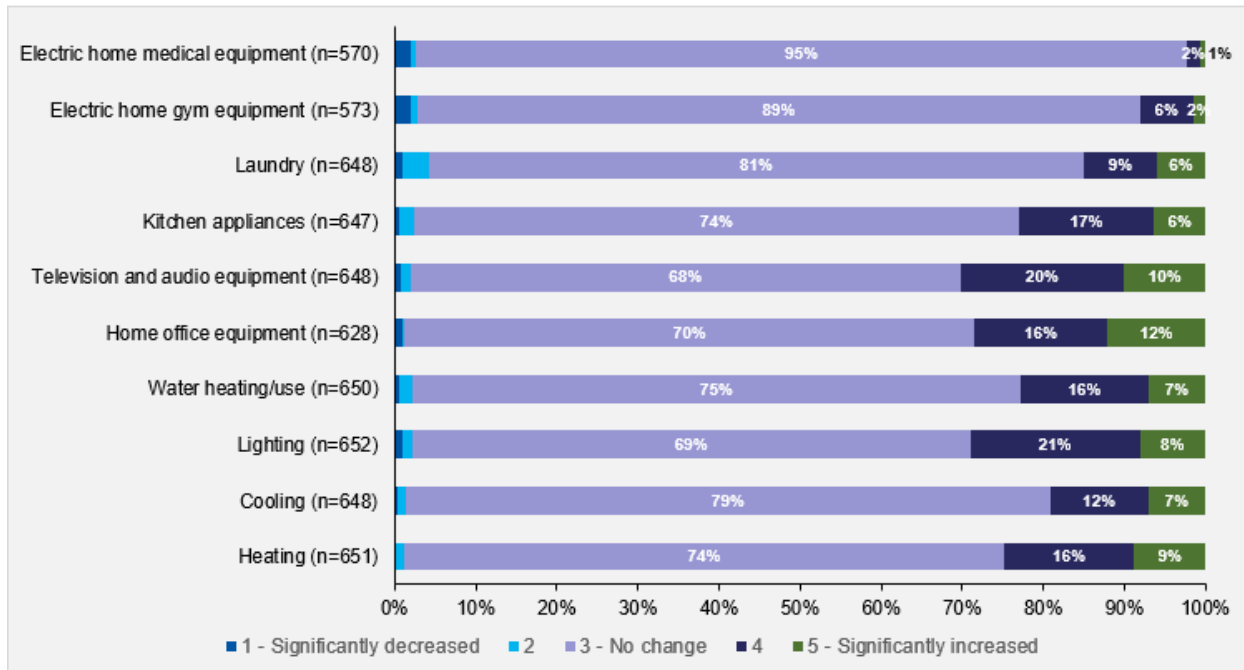


Source: General Population Survey Questions G1-G3, F3, and F5. “Do you have any wi-fi connected [DEVICE NAMES] in your home?”

COVID-19 Pandemic

As shown in Figure K-8, a large portion of respondents indicated that there were no changes to how they used energy at home compared to before the COVID-19 pandemic. The responses are similar for both limited-income and non-limited-income respondents.

Figure K-8. Changes in Energy Use Now Compared to Before COVID-19



Source: General Population Survey Question I2. “Using a scale from 1 to 5, where 1 is “significantly decreased”, 3 is “no change” and 5 is “significantly increased”, please rate any changes to how energy is used in your home now compared to before COVID-19.” (n=658)

When asked how COVID-19 affected energy efficiency upgrades, 7% of respondents (40 of 579) said they delayed their projects and 2% of respondents (14 of 573) said they completed energy efficiency upgrades sooner. As shown in Table K-3, the most common upgrades that were delayed were windows/doors (38% of respondents), insulation/basement (23% of respondents), and heating/cooling (20% of respondents).

Table K-3. Energy Upgrades Delayed due to COVID-19

Response	Percent of Respondents
Windows/doors	38%
Insulation/basement	23%
Other	20%
Heating/cooling	20%
Smart thermostat	3%
Water heater	3%
Washer/dryer	3%

Source: General Population Survey Question I7. “What upgrades were delayed due to COVID-19?” (n=40)

As shown in Table K-4, the most common reasons for the delay were cost (50% of respondents), fear of COVID-19 (25% of respondents), and labor not being available (18% of respondents).

Table K-4. Most Common Reasons for Delays

Response	Percent of Respondents
Cost	50%
Fear of COVID-19	25%
Labor not available	18%
Equipment/material out of stock	10%
Other	3%

Source: General Population Survey Question I7. “What upgrades were delayed due to COVID-19? – Why were they delayed?” (n=40)

Demographics

Table K-5 and Table K-6 show that most survey respondents live in single-family detached houses (80% of all respondents; 71% of limited-income respondents) and own their home (91% of all respondents; 79% of limited-income respondents). Both sets of percentages are somewhat higher than the Wisconsin average (71% of residents live in one-unit homes, and 67% own their home).

Table K-5. Type of Home

Response	All Respondents (n=658)	Limited Income (n=181)	Wisconsin Average ^a
Single-family, detached	80%	71%	71%
Attached house, 1-3 units	9%	9%	2 units - 6%
Multifamily apartment or condo building	8%	13%	3 or more units 19%
Mobile/manufactured home	2%	4%	3%
Other	1%	3%	N/A

Source: General Population Survey Question J1. “What type of home do you live in?” (Gen Pop n=477; Limited Income=181)

^a U.S. Census Bureau. Accessed March 28, 2022. “Community Facts.” American Community Survey 2020 data.

<https://data.census.gov>

Table K-6. Home Ownership

Response	All Respondents (n=658)	Limited Income (n=181)	Wisconsin Average ^a
Own/buying	91%	79%	67%
Rent/lease	9%	21%	33%

Source: General Population Survey Question J2. “Do you or members of your household own this home or do you rent?” (n=297)

^a U.S. Census Bureau. Accessed March 28, 2022. “Community Facts.” American Community Survey 2020 data.

<https://data.census.gov>

Survey respondents also had a higher level of education than the Wisconsin average. As shown in Table K-7, 28% of respondents had bachelor’s degrees and 27% had graduate degrees. Of Wisconsin residents, 20% have bachelor’s degrees and 11% have graduate degrees.

Table K-7. Level of Education

Response	% Respondents	WI Average
Less than a high school diploma	1%	7%
High school graduate, includes GED	15%	30%
Some college, no degree	16%	21%
Associates degree	13%	11%
Bachelor’s degree	28%	20%
Graduate or professional degree	27%	11%

Source: General Population Survey Question B8. What is the highest level of school that someone in your home has completed? (n=658)

^a U.S. Census Bureau. Accessed March 28, 2022. “Community Facts.” American Community Survey 2020 data.

<https://data.census.gov>

^b American Community Survey data used for Wisconsin average included one category for “some college or associate’s degree” for the 18 to 24 year old segment of the population. That population was split evenly between “some college, no degree” and “associate’s degree” in this table.

Survey respondents also had a slightly higher income level than the Wisconsin average. As shown in Table K-8, 21% of respondents made \$75,001 to \$100,000 and 19% made \$100,001 to \$150,000 compared to 14% and 16% of Wisconsin residents, respectively.

Table K-8. Household Income

Response	% Respondents	WI Average
Less than \$50,000	34%	39%
\$50,001 up to \$75,000	16%	19%
\$75,001 up to \$100,000	21%	14%
\$100,001 up to \$150,000	19%	16%
\$150,001 up to \$200,000	4%	6%
\$200,001 or more	6%	5%

Source: General Population Survey Question B9. Which category would you say best describes your annual total household income in 2020 before taxes? (n=658)

^a U.S. Census Bureau. Accessed March 28, 2022. “Community Facts.” American Community Survey 2020 data.

<https://data.census.gov>

Limited Income Characteristics Summary

The new enhancement in the survey this year of designating limited-income from non-limited-income participants provides insights to program administrators, as shown in Table K-9. Some aspects are shared by both groups, and others are distinct.

Table K-9. Limited-Income vs. Non-Limited-Income Characteristics

Similarities	Differences
<ul style="list-style-type: none"> • Awareness – All respondents were much more highly aware of Focus on Energy than in CY 2018. • Program participation – Similar ratios of limited-income and non- limited-income respondents had participated in a Focus on Energy offering at the time of the survey. • Awareness channels – Though non-limited-income respondents had slightly higher awareness than limited-income respondents, the channel types matched. Email was cited by both groups as the most preferred outreach method. • Brand affinity – All respondents highly agreed with the series of statements about Focus on Energy. • Barriers – All respondents said that upfront cost was the largest barrier to energy efficiency improvements. • Importance – Limited-income and non-limited-income respondents were in agreement about the importance of energy-efficiency for home health, safety, and comfort. • Connectivity – Both limited-income and non-limited-income reported home internet connection in the 90%'s, an increase from 79% in the 2018 survey. • COVID-19 – Energy usage between both groups was similar with regard to COVID-19. 	<ul style="list-style-type: none"> • Participation – Non-limited-income respondents were more likely than limited-income respondents to participate in programs if services were provided that fit their needs. • Energy burden – Limited-income respondents were more than twice as likely to say that energy bills during hot and cold months were a financial burden. • Nonparticipation – Limited-income respondents cited the biggest reason for not participating is because of lack of home ownership, whereas non-limited-income respondents cited not knowing the equipment or offerings. • Smart equipment – Non-limited-income respondents reported higher saturations of smart thermostats and smart bulbs than limited-income respondents.

Appendix L. Nonresidential General Population Survey Findings

The evaluation team conducted a telephone survey of nonresidential customers who had not participated in a Focus on Energy business program in the last year. These nonresidential customers comprise segments for hospitality (restaurants, hotels, or hospitality), healthcare, industrial or manufacturing, retail, agriculture, and other industries.⁶²

Objectives of the survey were to assess the following:

- Observe current levels of Focus on Energy awareness and compare to previous measurements
COVID-19 impacts on business operations and energy improvement propensity
- Identify the types and quantity of energy savings attributable to Focus on Energy in the form of nonparticipant spillover
- Identify trends in the commercial market compared to 2018 survey results and gauge market interest in specific technologies such as controls and smart thermostats

Methodology

From August to November 2021, the team contacted a random sample of 8,649 nonresidential customers across Wisconsin to assess their awareness of Focus on Energy and their motivations and challenges around implementing energy efficiency upgrades. Of these, 160 completed the survey. As shown in Table L-1, the team met its quotas of 30 survey completions for all segments except healthcare. Because the ongoing COVID-19 pandemic limited the time healthcare industry representatives had available to participate in the study, the team achieved only 18 complete responses.

The sample frame was taken from the Focus on Energy statewide potential study completed in CY 2020 that included 115,550 nonresidential customers across all industries and geographic locations in Wisconsin. Based on this population size, the 160 nonresidential nonparticipant surveys completed achieved 90% confidence at $\pm 6\%$ precision.

Respondents had to meet the following criteria to qualify for the nonresidential nonparticipant survey:

- Be a person at the business who makes decisions about equipment upgrades
- Represent a business that had not received a Focus on Energy incentive for installing energy efficient equipment or renewable energy in the last year

⁶² “Other” industries includes any business that is not one of the other five targeted segments. Survey results show that the other industries include property managers, transportation, local governments, public libraries, religious institutions, repair shops, and businesses services.

Table L-1. CY 2021 Nonresidential Nonparticipant Survey Sample Information

Segment	Sample Frame	Target Completes	Completed Surveys	Confidence/Precision
Hospitality (restaurants, hotels, or hospitality)	115,550	30	30	90/15
Healthcare (clinics, dental care, vision care, assisted living units, etc.)		30	18	90/19
Industrial or manufacturing		30	30	90/15
Retail		30	30	90/15
Agriculture		30	30	90/15
Other industries		20	22	90/18
Total			170	160

Survey Findings

This report presents results of the CY 2021 nonresidential nonparticipant survey by industry segment where differences between segments are meaningful. It also compares CY 2021 responses to CY 2018 responses for questions that were asked in both surveys. The CY 2018 survey did not stratify its sample by industry type.

Awareness of Focus on Energy Offerings

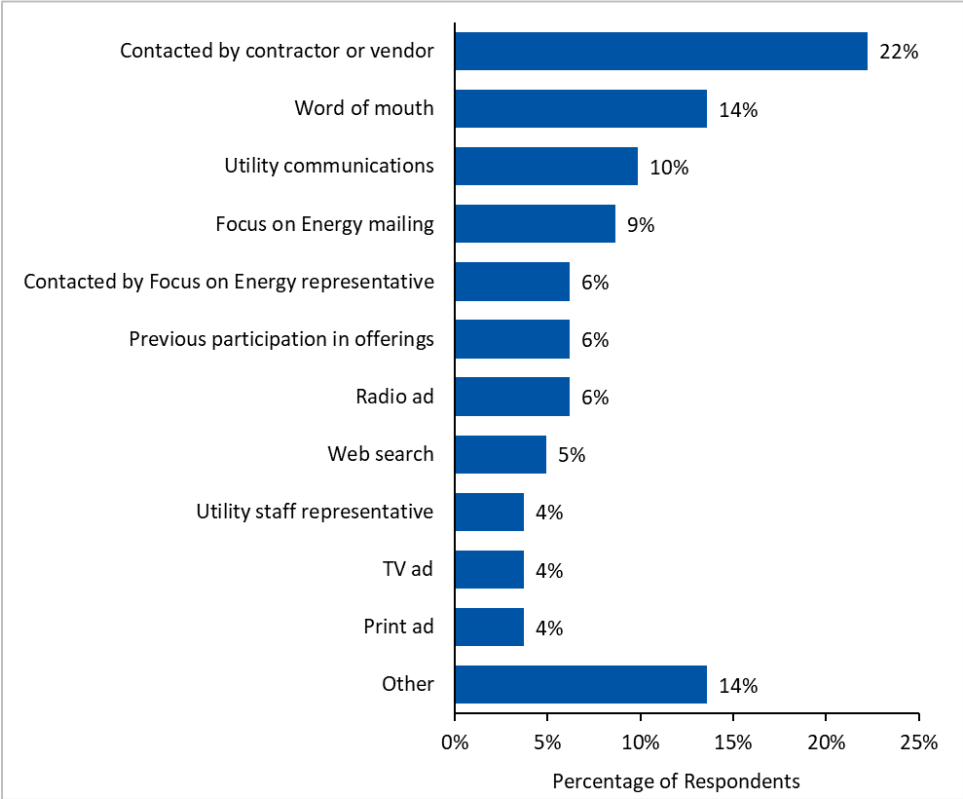
Of the 160 surveyed nonparticipant customers, 51% were aware of Focus on Energy nonresidential incentives, which was not significantly different from nonparticipant survey results of CY 2018 (48%, n=140) or CY 2015 (53%, n=122).

The evaluation team did find significant differences in awareness by segment in CY 2021. For industrial or manufacturing and agriculture businesses, 67% were aware of incentives (both n=30). For the other segments, awareness ranged from 40% to 44% (from n=18 to n=30).⁶³

The top sources of awareness of nonresidential incentives are listed in Figure L-1. Respondents who were aware of Focus on Energy incentives learned about them from different sources depending on their segment. As in CY 2018, contractors and vendors were the most common source of information overall in CY 2021 (22%) and for industrial or manufacturing (45%) and agriculture (30%), the two segments that also had the highest overall awareness of incentives. However, utilities were the most common source of awareness for hospitality businesses (23%, n=13).

⁶³ Industrial (67%) and agriculture (67%) are significantly different from restaurants, hotels, or hospitality (43%) and retail (40%) at p<0.10 using binomial t-tests (all groups n=30). Healthcare (44%) was not significantly different from other segments due to a smaller sample size (n=18).

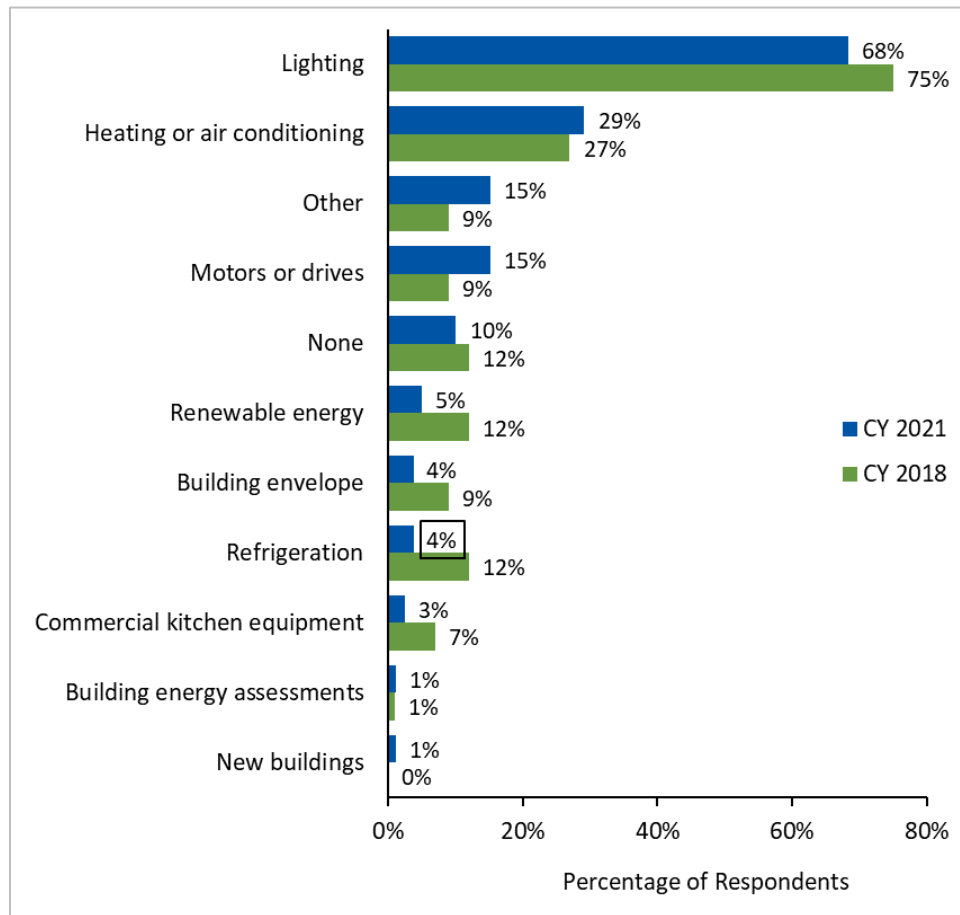
Figure L-1. Top Sources of Incentive Awareness



Source: Nonparticipant Survey Question C4. “How did you learn about these offerings?”
Multiple responses allowed (n=81).

In CY 2021, respondents were most frequently familiar with lighting incentives (68%, n=79) followed by heating and air conditioning (29%) incentives, which was consistent with CY 2018 survey results (Figure L-2).

Figure L-2. Awareness of Focus on Energy Incentives by Equipment Type

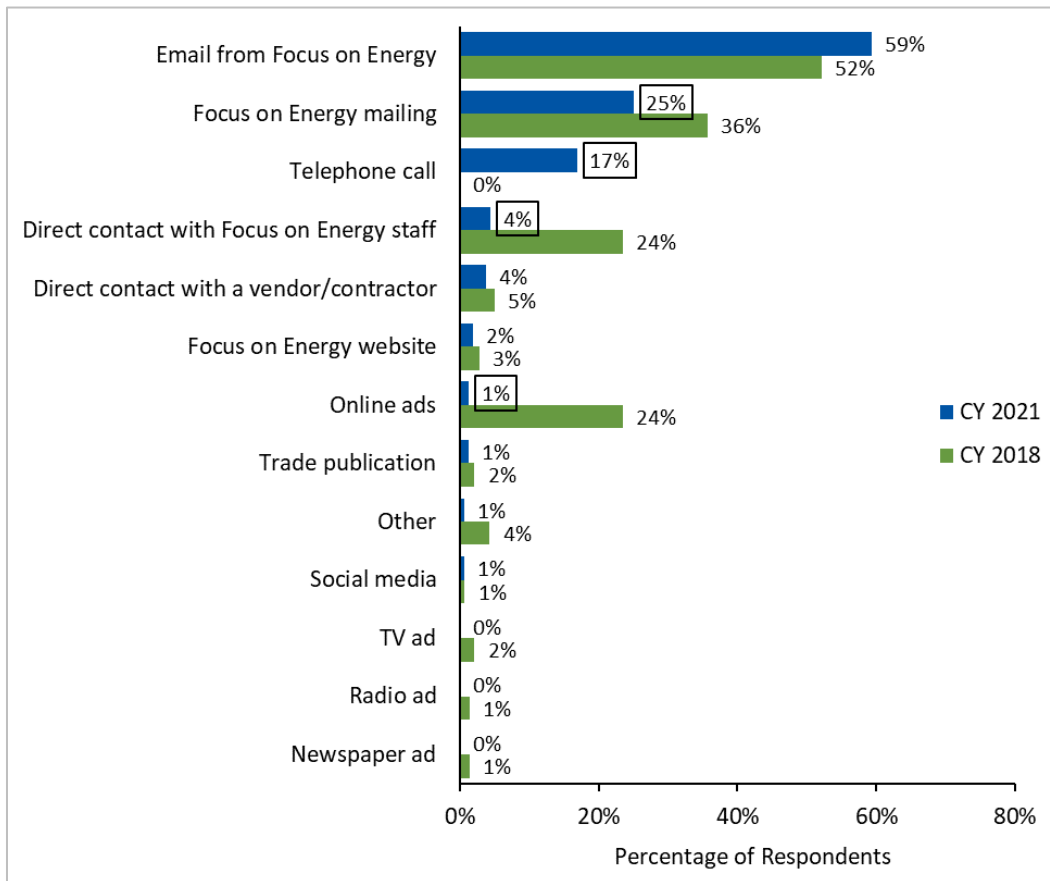


Source: Nonparticipant Survey Question C3. “Which Focus on Energy incentive programs, if any, come to mind?” Multiple responses allowed (CY 2021 n=79, CY 2018 n=67). Boxes around numbers indicate a statistically significant difference between years at $p < 0.10$ or better.

Emails from Focus on Energy were the most popular method of communication in CY 2021 (59%) and CY 2018 (52%), but other respondent preferences for marketing tactics changed (Figure L-3). When asked how Focus on Energy should convey information about business incentives, respondents said the best methods were email from Focus on Energy (59%), Focus on Energy mailing (25%), or telephone call (17%).

Far fewer CY 2021 respondents chose direct contact from Focus on Energy staff (4%) compared to CY 2018 (24%), while 17% of CY 2021 respondents said their preferred method of communication was telephone calls (this was not a pre-coded response option in the survey) compared to 0% in CY 2018. The sum of these direct contact and telephone calls categories was similar in CY 2021 (21%) and CY 2018 (24%), so the team believes this shift reflects social distancing guidelines during the COVID-19 pandemic—that is, customers do not want direct contact in the sense of in-person contact. Significantly fewer customers mentioned Focus on Energy mailings in CY 2021 (25%) compared to CY2018 (36%), with an even steeper decline for online advertising in CY 2021 (1%) from CY 2018 (24%).

Figure L-3. Preferred Methods of Communication about Focus on Energy Incentives

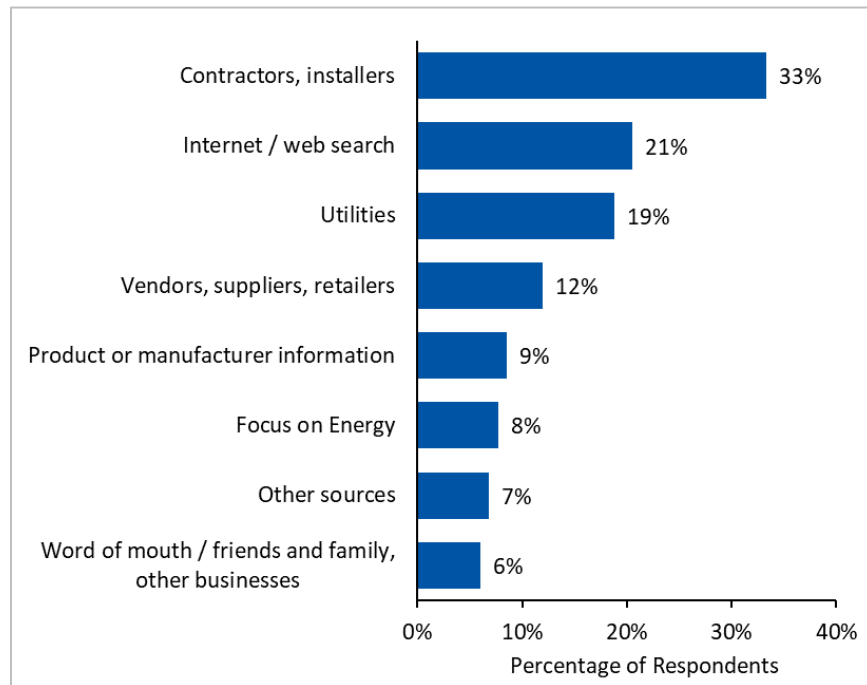


Source: Nonparticipant Survey Question C8. “What is the best way for Focus on Energy to let you know about their incentives for energy-efficient improvements?” Multiple responses allowed (CY 2021 n=160, CY 2018 n=140). Boxes around numbers indicate a statistically significant difference between years at p<0.10 or better.

The evaluation team asked respondents what sources they trusted for information on energy efficiency. As shown in Figure L-4, the most common responses were contractors and installers (33%), information on the internet (21%), and utilities (19%). Eight percent of respondents said Focus on Energy was their trusted source, consistent with the results from CY 2018 (8%, n=66). CY 2021 results varied by industry:

- Healthcare respondents were least likely to mention contractors (18%, n=11) and product or manufacturer information (0%); their most-mentioned source was utilities (27%)
- Agriculture respondents were most likely to trust word of mouth/friends, family, and other businesses (20%, n=25)
- Retail respondents were most likely to trust the internet (37%, n=19), and they were the segment that was most likely to mention Focus on Energy (16%).
- No restaurant respondents mentioned Focus on Energy (0%, n=20)

Figure L-4. Trusted Sources of Information on Energy Efficiency

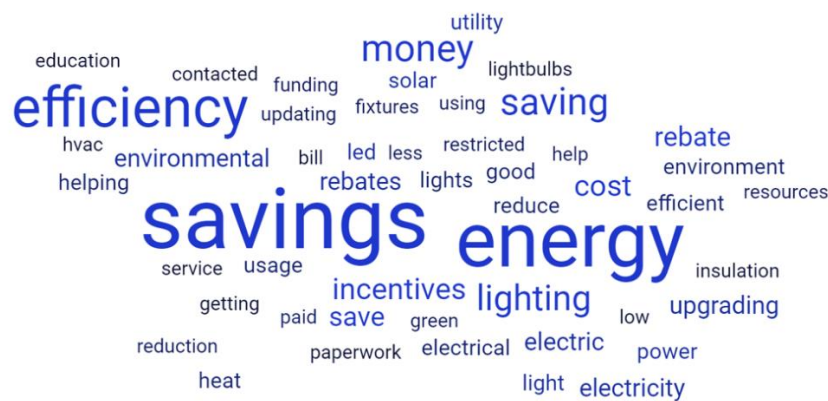


Source: Nonparticipant Survey Question D6. “Who or what sources do you seek out as a trusted source of information regarding energy efficiency?” (n=117). Responses total to more than 100% because multiple responses were allowed.

Brand Awareness and Perception of Focus on Energy

Respondents who were aware of Focus on Energy incentives were asked for the first three words that came to mind when thinking about Focus on Energy. The most common words were savings, energy, and efficiency. Other common words were incentives, lighting, the environment, or were about money. Figure L-5 shows a word cloud representing these responses.

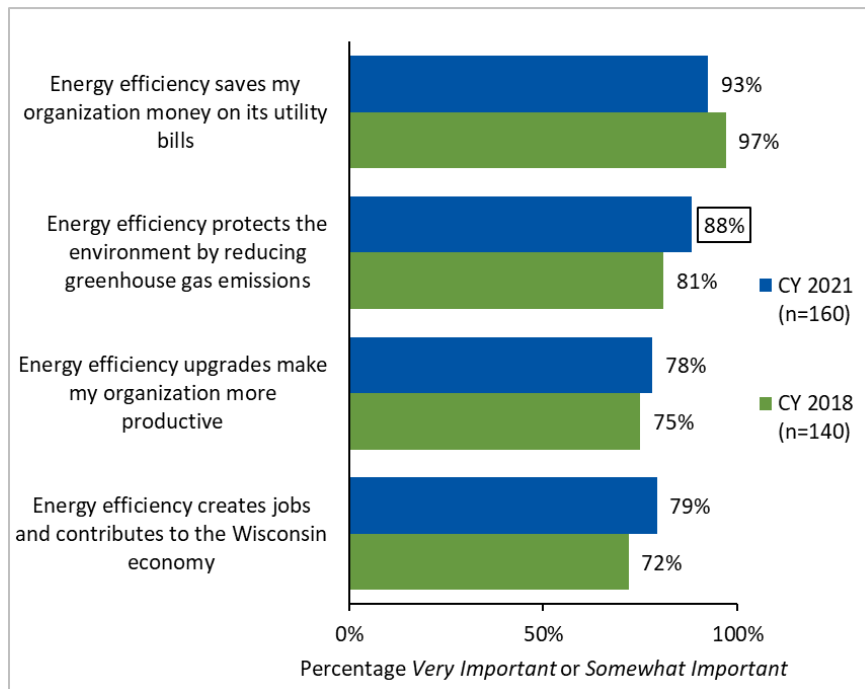
Figure L-5. Word Cloud of Respondents’ Descriptions of Focus on Energy



Source: Nonparticipant Survey Question C2. “What are the first three words that come to mind when you hear “Focus on Energy?”” (n=74)

When asked to rate the importance of four statements about energy efficiency, 93% of respondents said energy efficiency saves my organization money on its utility bills was *very important* or *somewhat important* (Figure L-6). Survey respondent ratings were statistically consistent between CY 2021 and CY 2018 for all but one statement. Significantly more respondents said energy efficiency protects the environment by reducing greenhouse gas emissions in CY 2021 (88%) than in CY 2018 (81%).

Figure L-6. Importance of Statements about Energy Efficiency



Source: Nonparticipant Survey Question D4. “Please indicate how important these statements are to you when deciding whether to make energy efficient improvements to your facility.” Boxes around numbers indicate a statistically significant difference between years at $p < 0.10$ or better.

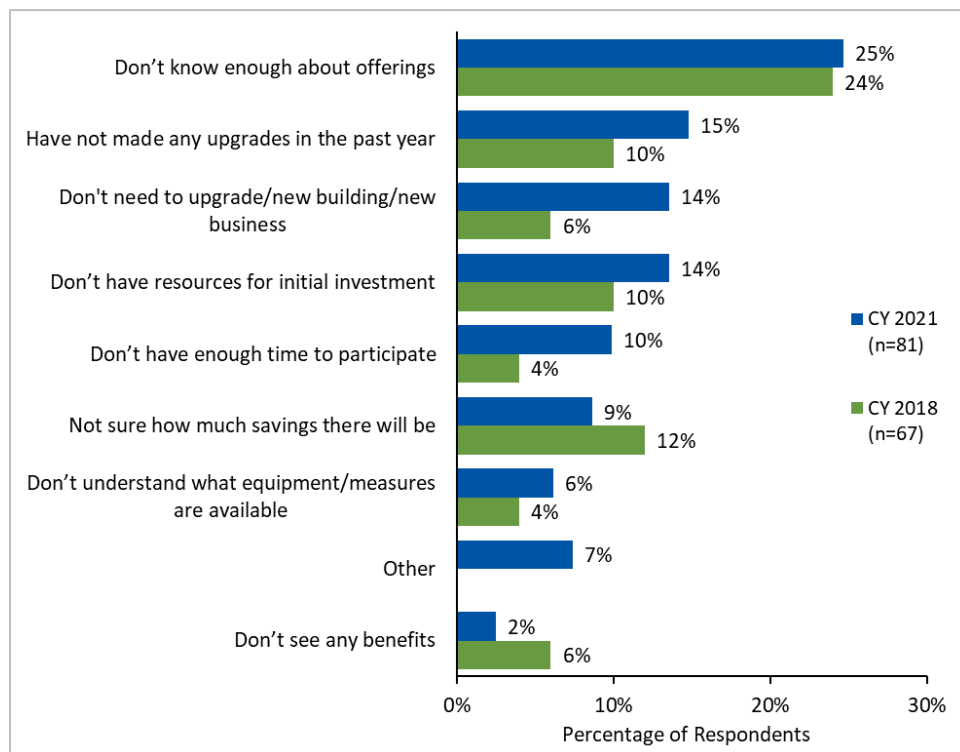
The evaluation team also asked respondents to rank which of the four statements about energy efficiency benefits was the most important to them overall. Of 154 respondents, 67% chose energy efficiency saves my organization on its utility bills, followed by protects the environment (18%), makes my organization more productive (10%), and creates jobs and contributes to the Wisconsin economy (5%).

Retail businesses were more likely than other segments to choose protects the environment (40%, $n=30$), while industrial or manufacturing and agriculture were most likely to choose upgrades make my organization more productive (both 17%, $n=30$ and $n=29$, respectively). The only businesses from targeted segments that selected creates jobs and contributes to the Wisconsin economy were industrial or manufacturing and agriculture (both 7%).

Motivations and Barriers to Participation

The most common reason respondents gave for not participating in the last year was that they did not know enough about the Focus on Energy offerings (25%), which was consistent with the 24% in CY 2018. In addition, 15% of respondents said they had not made upgrades of any kind in the past year, 14% were new businesses or occupying a new building, and 14% did not have resources for the initial investment. Figure L-7 shows respondents’ reasons for not participating. Other responses include leasing space, corporate decision-making policies, timing issues with a contractor, and not getting a response to an inquiry about a project.

Figure L-7. Reasons for Nonparticipation

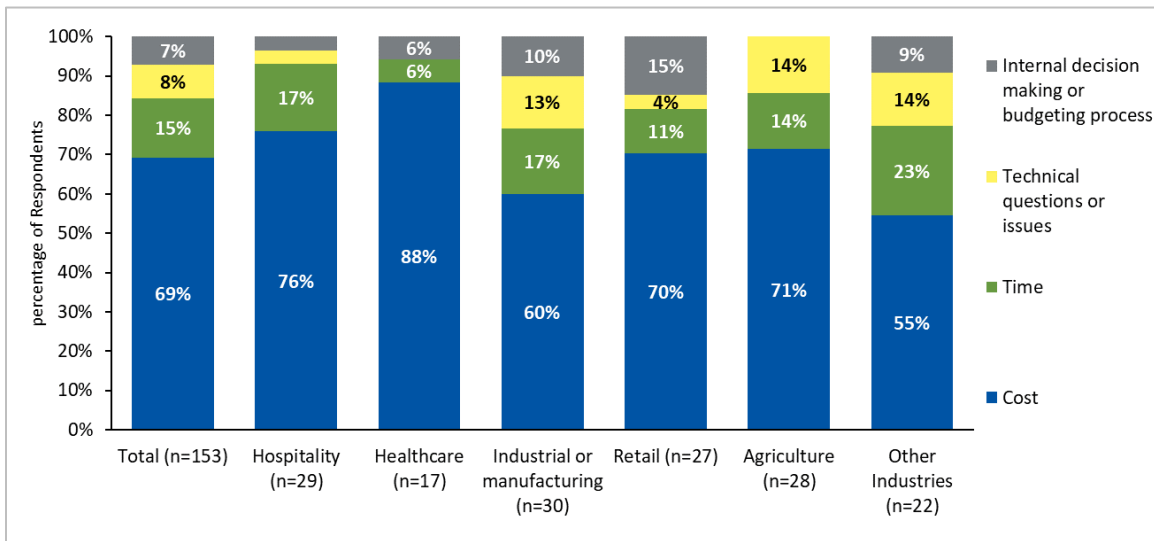


Source: Nonparticipant Survey Question E6. “What are the reasons you have not participated in a Focus on Energy program in the past year?”

When asked what would motivate them to participate in a Focus on Energy offering, 38% (n=68) of respondents said more advertising and information about what offerings were available, 34% said higher incentives, and 9% said lower costs for equipment and products.

Respondents overwhelmingly said cost was the biggest challenge to implementing energy efficiency projects at their organizations (69% overall). This was also the most common challenge for all surveyed segments, ranging from 88% of healthcare respondents to 55% of respondents in other industries (Figure L-8). Fewer respondents identified time (15%), technical questions or issues (8%) or internal processes (7%) as their most significant challenge.

Figure L-8. Largest Barriers to Implementing Energy Efficiency Projects and Upgrades

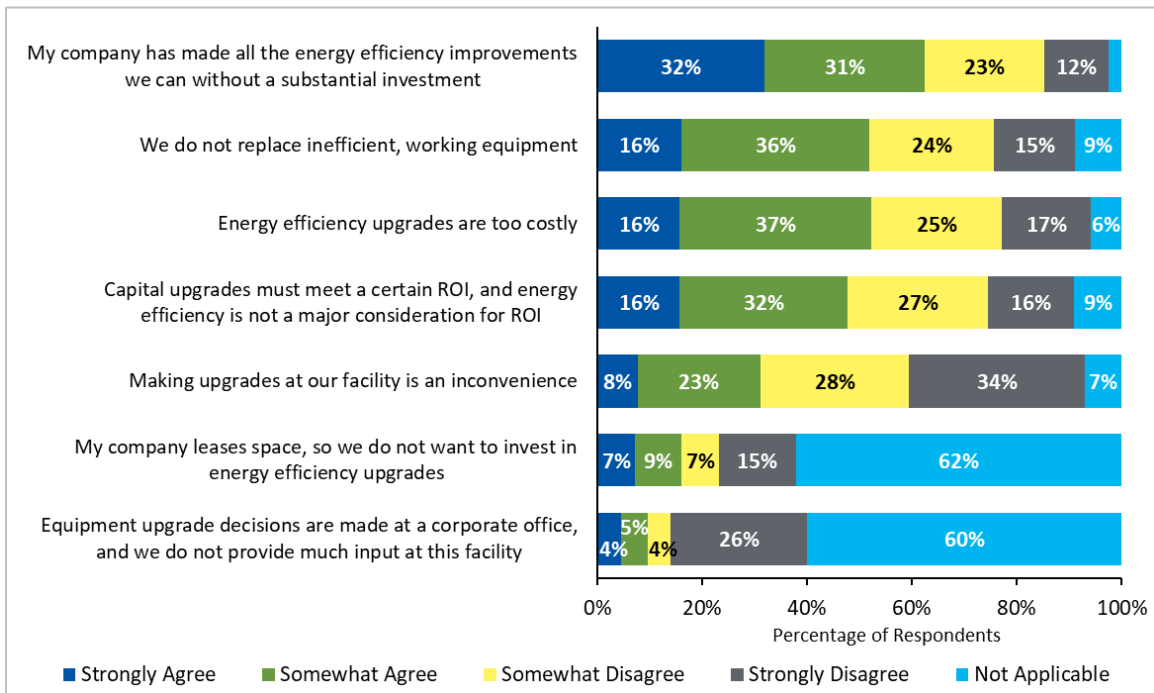


Source: Nonparticipant Survey Question E2. “If you had to choose just one, what would you say is normally the largest challenge in implementing energy efficiency projects and upgrades at your organization?”

Respondents rated their agreement with statements about specific barriers to implementing energy efficiency projects (Figure L-9). Most respondents *strongly agreed* or *somewhat agreed* that their business has made all the energy efficiency improvements it can without substantial investment (62%), that they will not replace working heating and cooling equipment (52%), and that upgrades for their facility are too costly (52%). These three statements also had the highest levels of agreement in the CY 2018 survey.

Relatively few respondents agreed that upgrading their facility was inconvenient (31%), that they did not want to invest in upgrades because their facility was leased (16%), or that they had little input into corporate decision making (9%).

Figure L-9. Specific Challenges to Implementing Energy Efficiency Projects and Upgrades

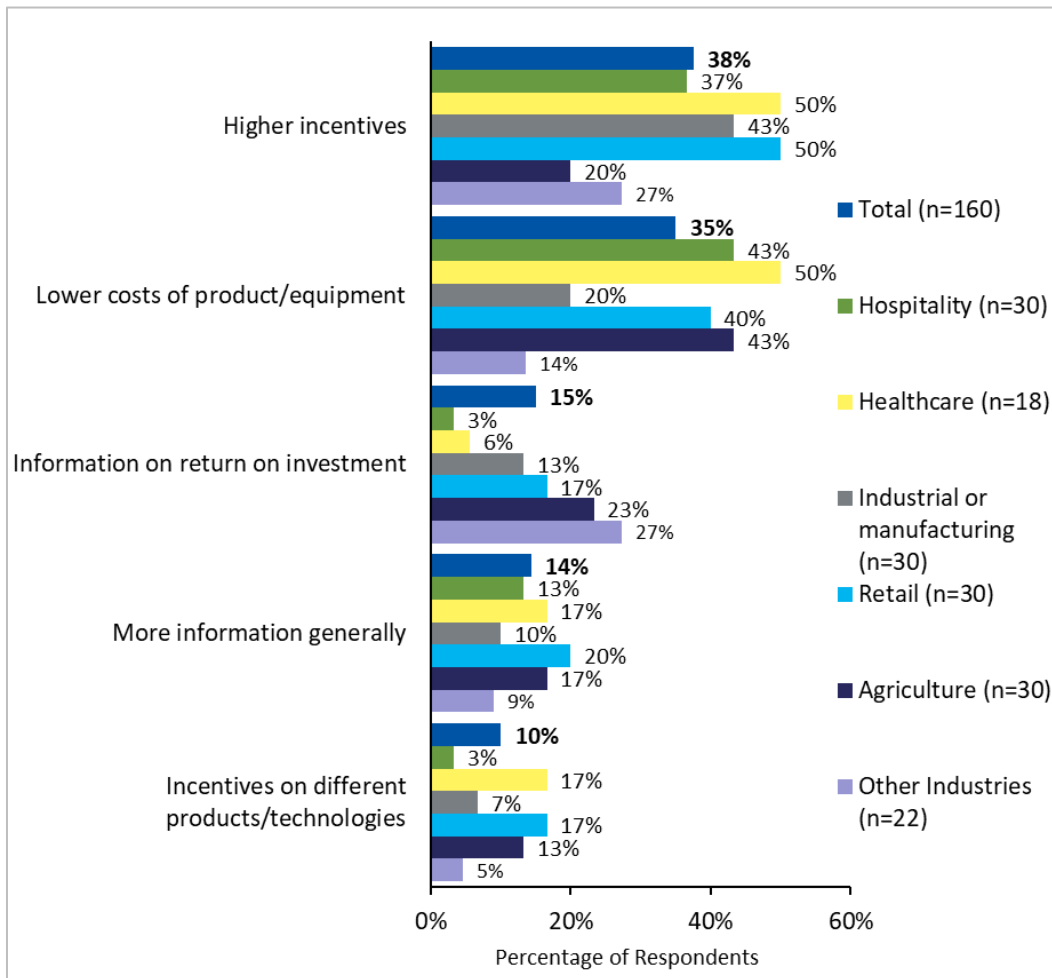


Source: Nonparticipant Survey Question E1. “Please tell me whether you agree with these statements.” (n= 153 to 158). Percentages do not total to 100% due to rounding, and some percentages do not appear to match the narrative above due to rounding.

The evaluation team asked respondents what would make them more likely to purchase more energy-efficient equipment or to upgrade their current equipment in general (Figure L-10). Of 160 respondents, 38% said higher incentives and 35% lower costs of products/equipment. Healthcare businesses were the most likely to mention those two motivations (both 50%, n=18), while agriculture businesses were least likely to mention higher incentives (20%, n=30) and industrial or manufacturing (20%, n=30) and other industries (14%, n=22) were least likely to mention lower costs of products/equipment.

Thirty respondents volunteered that they would be motivated by other things (this response not shown in Figure L-10), including grants, energy analysis of their facilities, technical support, lower electric costs (including by applying incentives to utility bills), loans and financing, and streamlining the incentive application process.

Figure L-10. What Would Motivate Respondents to Purchase Energy-Efficient Equipment



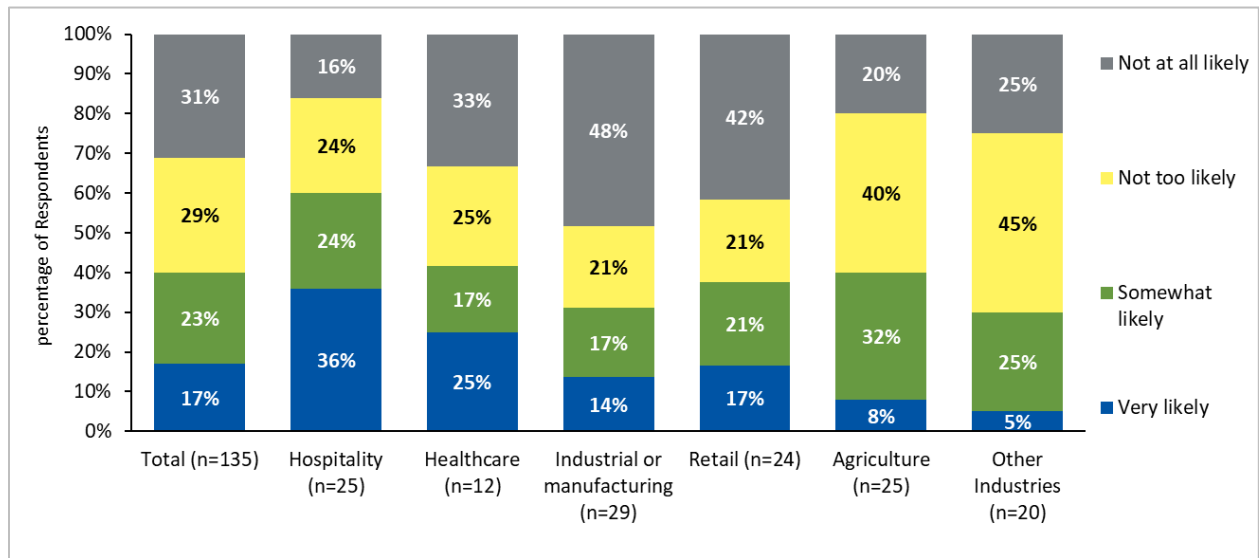
Source: Nonparticipant Survey Question E3. “What would motivate your business to make more energy-efficient purchases or upgrades on current equipment?” Responses total to more than 100% because multiple responses were allowed.

Decision-Making and Energy Efficiency Attitudes

When asked about their likelihood to participate in a Focus on Energy program in the future, 40% of respondents would be either *somewhat likely* or *very likely* to apply for an incentive in the next six months (Figure L-11). The hospitality segment had the highest likelihood ratings (60%), while almost half of industrial or manufacturing businesses were *not at all likely* (48%).

Overall, CY 2021 likelihood ratings were similar to CY 2018, when 45% (n=137) said they were *somewhat likely* or *very likely* to apply for incentives in the next six months. Of the CY 2021 respondents who were likely to participate, 43% (n=54) said they were considering upgrading lighting and 39% said they were considering upgrading HVAC systems.

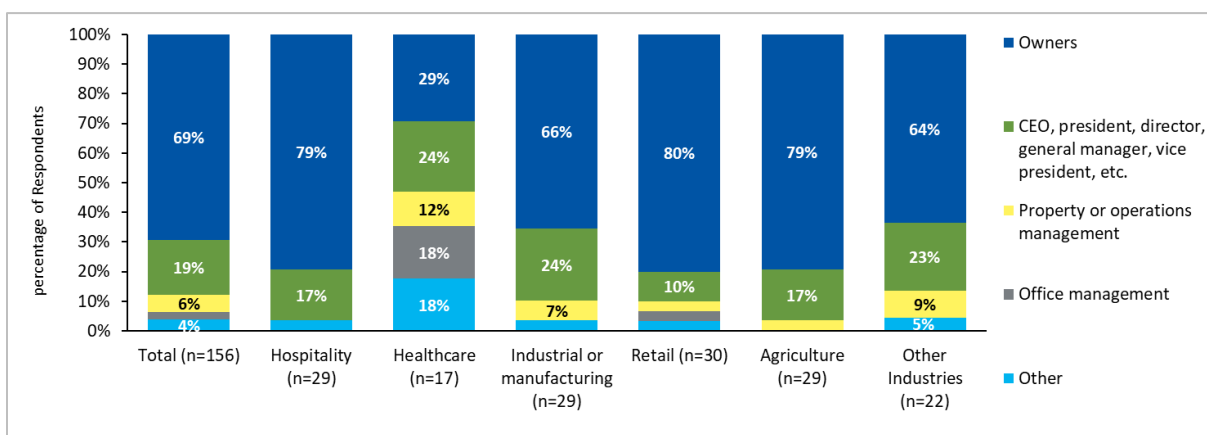
Figure L-11. Likelihood of Applying for a Focus on Energy Incentive in the Next Six Months



Source: Nonparticipant Survey Questions C5 and C6. “[If not previously aware of Focus on Energy: The Focus on Energy business offerings provide financial incentives and engineering services to businesses to help install energy efficient equipment such as heating and cooling equipment, lighting, pumps, kitchen equipment, and others.] How likely is it that your business requests an incentive from a Focus on Energy program for an energy efficiency project in the next 6 months? Would you say...” Percentages do not total to 100% due to rounding.

Most respondents said the business owner was the primary decision-maker for energy efficiency upgrades (69%). The exception was in the healthcare segment, in which owners were the primary decision-maker for only 29% of businesses (Figure L-12). Senior management with titles such as president, CEO, director, and general manager accounted for another 19% of primary decision-makers across all segments. Property and operations management made up 6%. Office managers were mentioned by 3% of respondents overall but made up 18% of healthcare industry decision-makers. Decision-makers classified as “other” included boards of directors, a city council, a school, and doctors.

Figure L-12. Primary Decision-Maker for Energy Efficiency Upgrades



Source: Nonparticipant Survey Question D3. “What is the role or title of the primary decision-maker regarding energy efficiency equipment upgrades?” Percentages do not total to 100% due to rounding.

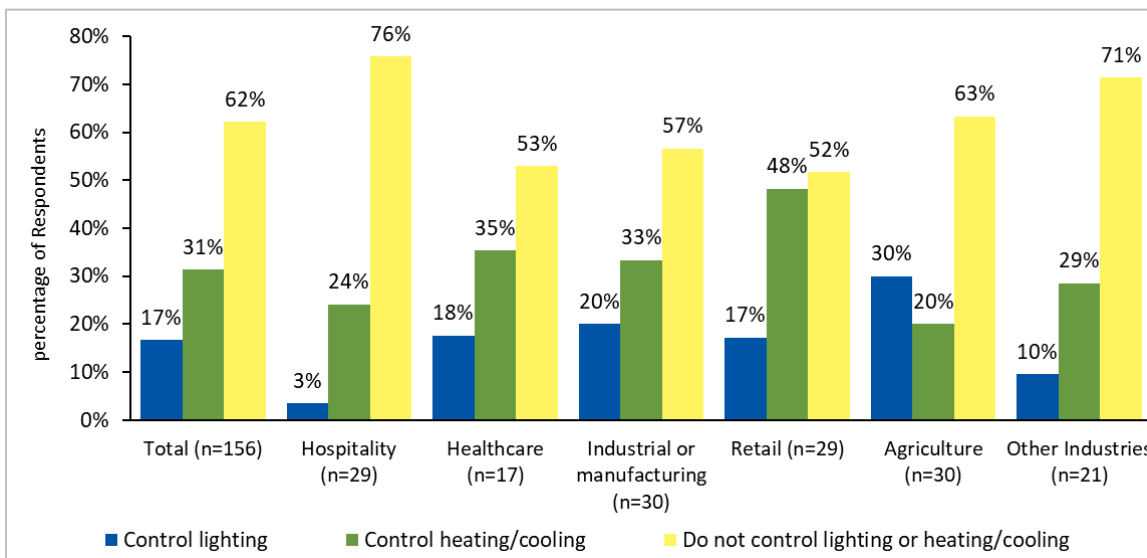
In CY 2021, 13% (n=156) of respondents said their business had corporate policies about energy efficiency that are considered when purchasing new equipment or making improvements, and this rate was similar across the six surveyed segments, from 10% (n=18) to 17% (n=30). The CY 2018 survey found that only 8% (n=138) of respondents had such policies.

The exact corporate policies around energy efficiency varied among businesses. The most common were always purchase energy-efficient equipment as a rule (five respondents), purchase energy-efficient equipment if it meets return on investment criteria (five respondents), and purchase energy efficiency equipment if it fulfills goals or requirements from a sustainability plan or policy (four respondents).

Interest in Building Controls and Demand Response

The evaluation team assessed respondents’ current use of energy management and demand response technology and found that usage varied by segment. As shown in Figure L-13, most respondents overall (62%) did not use automated or smart controls. Just 17% of respondents used automated or smart equipment to control lighting, and 31% used such equipment to control heating and cooling. The least likely to use automated or smart controls of either type were hospitality (76%) and other industries (71%). Lighting controls were more common among agriculture respondents (30%) than other segments, while hospitality respondents were least likely (3%) to have lighting controls. Use of heating and cooling controls was more common among retail respondents (48%) than other segments. The evaluation team recognizes that some respondents who use programmable thermostats or occupancy sensors may not have considered those technologies to count as automated or smart controls.

Figure L-13. Current Use of Automated or Smart Controls

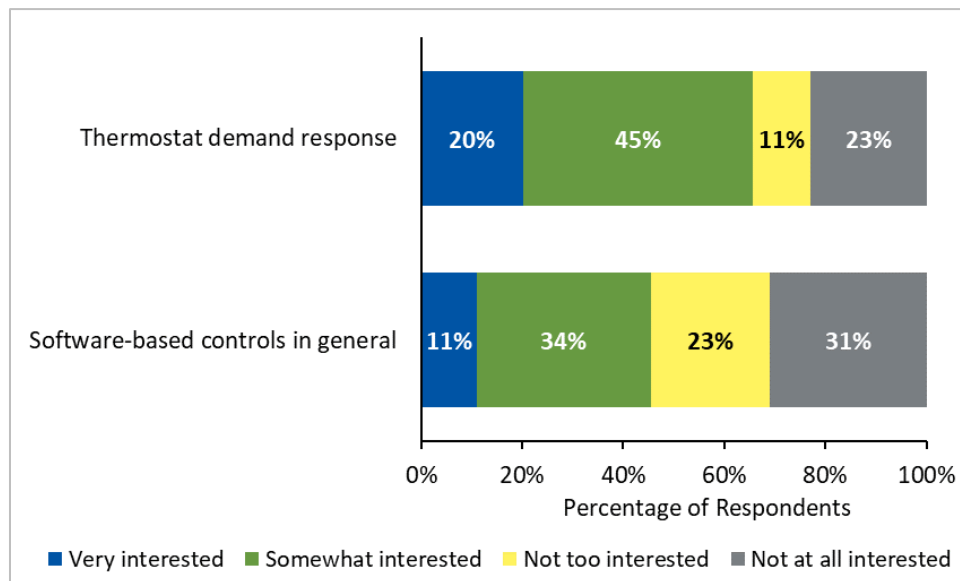


Source: Nonparticipant Survey Question I1. “Does your business use automated or smart devices to control space heating and cooling and/or lighting in your facilities? (Check all that apply)”. Response options were “smart thermostat”, “energy management system”, and “Other (please specify). Percentages may total to more than 100% because respondents may have both lighting and heating/cooling controls.

Of respondents who used smart or automated controls for heating and cooling, 82% (n=49) were using smart thermostats and 18% were using an energy management system or computer software.

The evaluation team asked respondents to rate their level of interest in a thermostat-based demand response offering and how receptive their business was in general to using software to control lighting, heating, cooling, and process systems. About two-thirds were *very interested* or *somewhat interested* in the demand response offering (66%), while only 46% expressed the same level of interest in software controls in general (Figure L-14).

Figure L-14. Interest in Demand Response and Software Controls

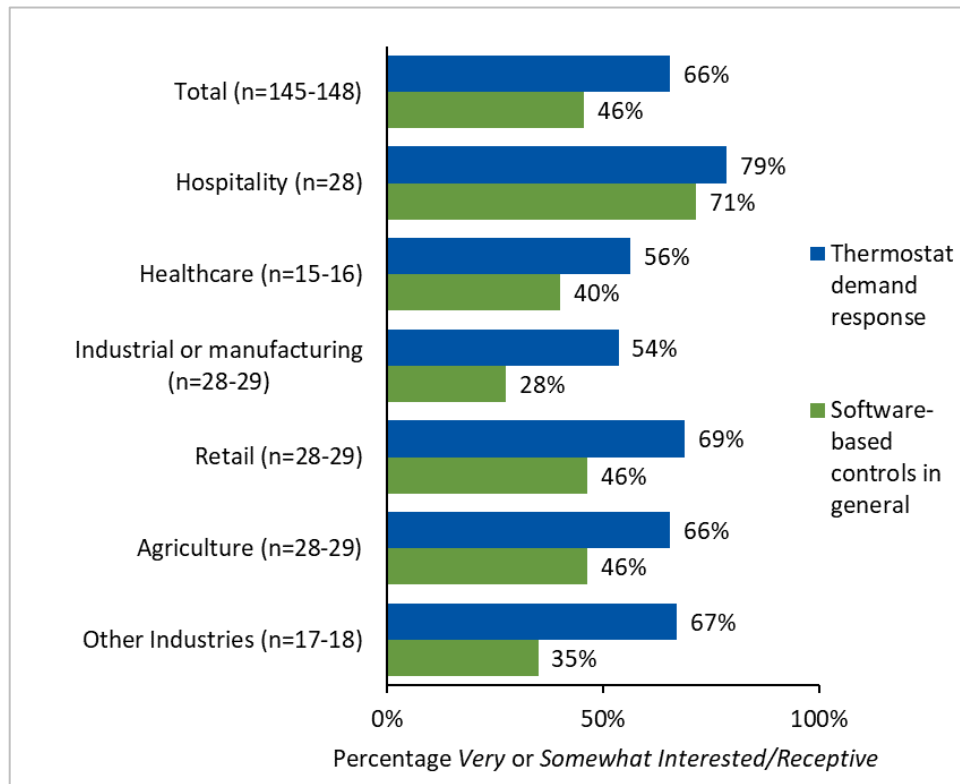


Source: Nonparticipant Survey Question I3. “How interested would you be in a program that provides a bill credit in return for adjusting your thermostat or using less energy at certain times during the day?” (n=148) and I4. “More broadly speaking, how receptive is your business to allowing software controls to make data-informed decisions regarding your commercial energy equipment such as HVAC system, lighting, and/or process equipment?” (n=145)
 Percentages do not total to 100% due to rounding.

General interest in thermostat demand response and software-based controls differed by segment (Figure L-15). Hospitality respondents were the most interested in both (79% *very interested* or *somewhat interested* in thermostat demand response and 71% *very receptive* or *somewhat receptive* to controls in general).

For all surveyed segments, 54% to 79% of respondents were interested in demand response. However, for software controls in general, the most interest was in the hospitality segment (71%), while less than half the respondents in the other segments were receptive (28% to 46%). Industrial or manufacturing businesses were the least receptive to software controls (28%).

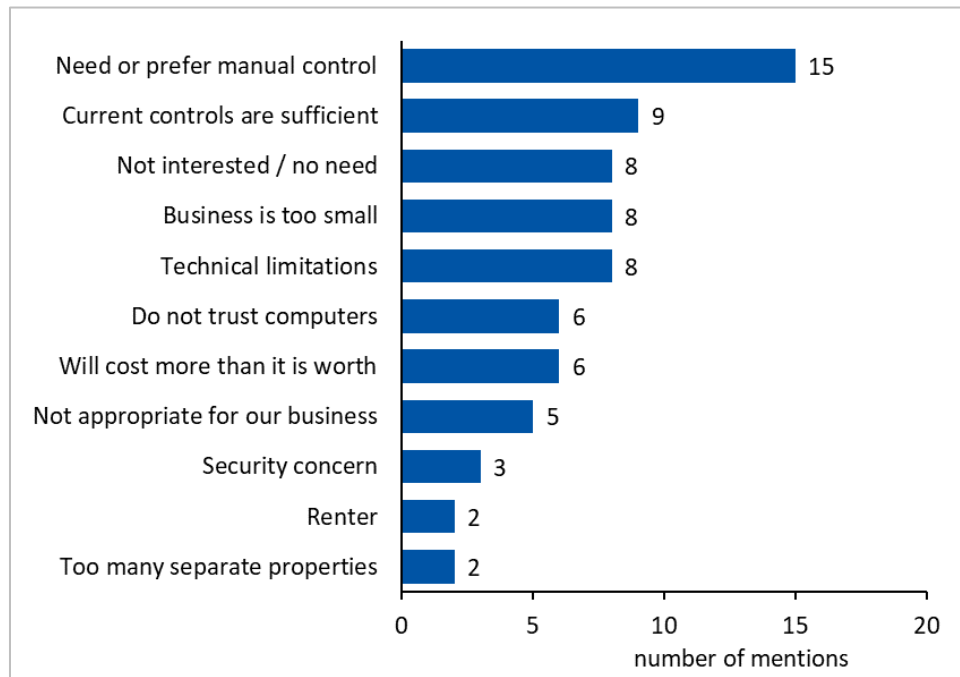
Figure L-15. Interest in Demand Response and Software Controls by Segment



Source: Nonparticipant Survey Question I3. “How interested would you be in a program that provides a bill credit in return for adjusting your thermostat or using less energy at certain times during the day?” and I4. “More broadly speaking, how receptive is your business to allowing software controls to make data-informed decisions regarding your commercial energy equipment such as HVAC system, lighting, and/or process equipment?”

The evaluation team asked respondents who rated their interest in software controls as *not too receptive* or *not at all receptive* for their reasons. The most common response was preferring or requiring manual control of their systems (Figure L-16). Other common responses included that current system controls were sufficient, a general lack of interest in software controls, and the business was too small to benefit from software controls. Responses coded as technical limitations included lack of technological savvy, internet access, corporate or IT policies, and building codes. Four of the five respondents who said software controls would not be appropriate for their business were in the healthcare segment, and three of these specifically mentioned assisted living facilities.

Figure L-16. Reasons for Not Being Receptive to Software Controls



Source: Nonparticipant Survey Question 15. “Why do you say that?” (n=72 mentions)

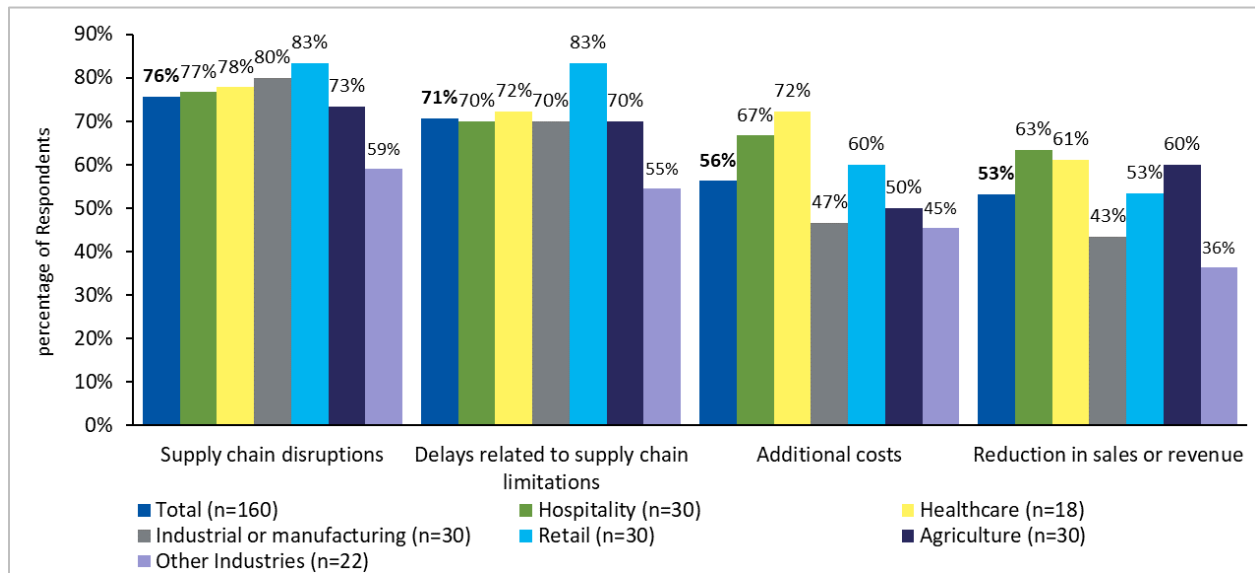
COVID-19 Impacts and Response

The evaluation team assessed the impact of the COVID-19 pandemic on Wisconsin businesses and how steps these businesses have taken in response may impact energy efficiency plans and projects. These survey questions were not asked in previous years.

Figure L-17 shows the four most common effects of the pandemic, which were all reported by a majority of surveyed businesses: supply chain disruptions (76%), delays related to supply chain (71%), additional costs (56%), and reduced revenue or profit (53%). Supply chain issues were consistently cited by large majorities across the five targeted segments; retail businesses were the most likely to have faced disruptions and delays (both 83%).

Additional costs and reduced revenue and profit were mentioned most frequently by healthcare businesses (72% and 61%, respectively) and hospitality (67% and 63%, respectively). Industrial or manufacturing businesses were the least likely to be affected by additional costs (47%) and reduced revenue and profit (43%), though almost half felt these impacts.

Figure L-17. Most Common Overall Impacts of the COVID-19 Pandemic

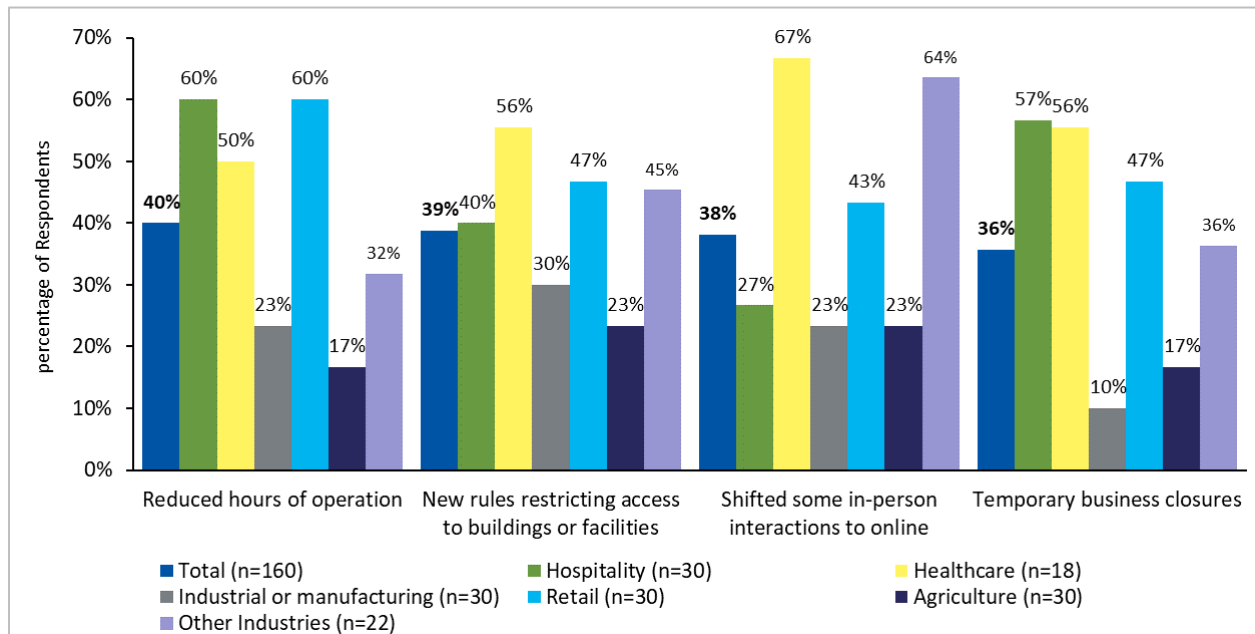


Source: Nonparticipant Survey Question G1. “We recognize that 2020 was an atypical year for many reasons. We are interested in learning how your business was affected and how your business operations, plans and priorities may have changed as a result. Please let me know if your business experienced...”

The pandemic had different impacts by segment on building use (Figure L-18). Retail (60%) and hospitality (60%) were the most likely segments to have reduced hours of operation, and these businesses (47% and 57%, respectively) and healthcare (56%) were the most likely to have had temporary closures.

Retail and healthcare businesses were also the most likely to have restricted access to their facilities (47% and 56%, respectively) and to have shifted some in-person interactions online (43% and 67%, respectively). For this set of impacts, the least-affected segments were industrial or manufacturing and agriculture, particularly for reduced hours of operation (23% and 17%, respectively) and temporary closures (10% and 17%, respectively).

Figure L-18. Impacts of the COVID-19 Pandemic on Facility Operations



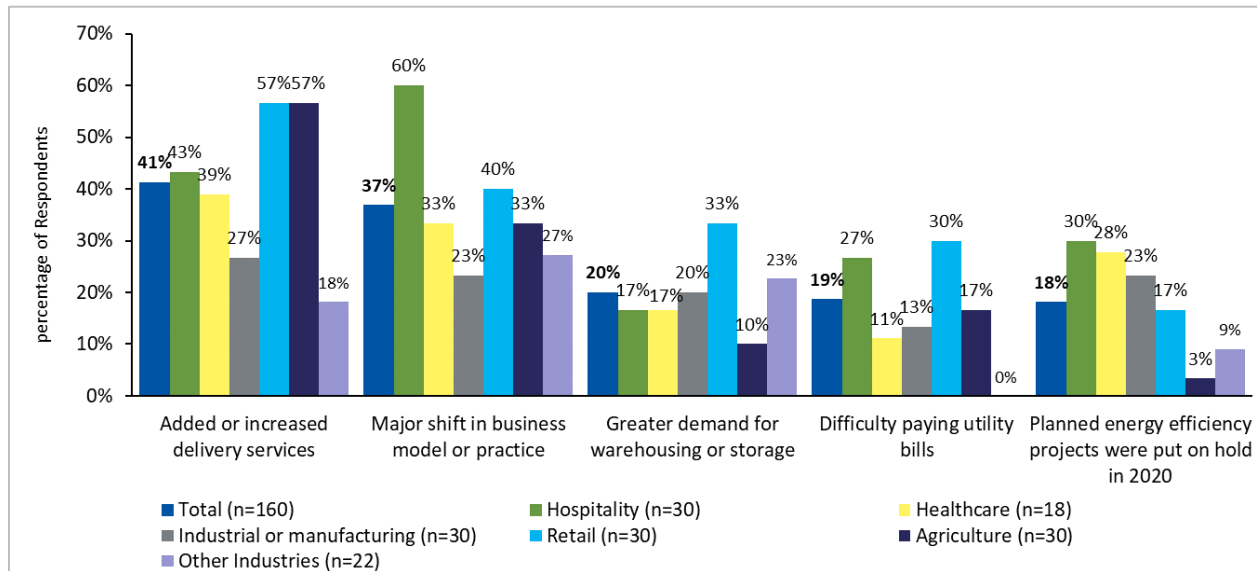
Source: Nonparticipant Survey Question G1. “We recognize that 2020 was an atypical year for many reasons. We are interested in learning how your business was affected and how your business operations, plans and priorities may have changed as a result. Please let me know if your business experienced...”

Most retail (57%) and agriculture (57%) respondents increased delivery services, and 60% of hospitality businesses reported a major shift in their business model or practice (Figure L-19). Only 20% of respondents had increased demand for warehousing or storage, though this was more prevalent for the retail segment (33%).

Overall, 19% of surveyed businesses reported difficulty paying utility bills, though the percentages were higher for retail (30%) and hospitality (27%). Only 18% of respondents reported delaying an energy efficiency project in 2020 due to the pandemic, though the rate varied by segment from 30% of retail and 28% of healthcare businesses down to just 3% of agriculture businesses.

Among the 29 respondents who reported delaying energy efficiency projects in 2020, only one (3%) decided not to proceed with the project. Thirty-one percent of respondents planned to have these projects completed by the end of 2021, while 48% intended to complete them in 2022 or later. The remaining 17% were not sure if or when these projects would be completed.

Figure L-19. Impacts of the COVID-19 Pandemic on Business Model, Utility Bills and Energy Efficiency Projects



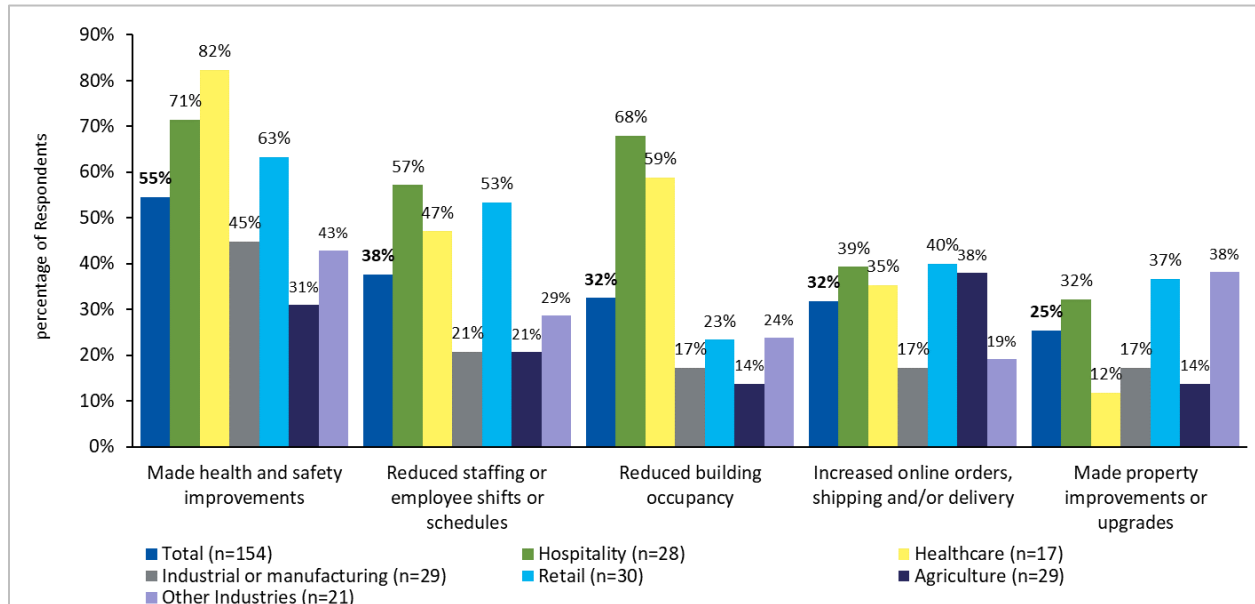
Source: Nonparticipant Survey Question G1. “We recognize that 2020 was an atypical year for many reasons. We are interested in learning how your business was affected and how your business operations, plans and priorities may have changed as a result. Please let me know if your business experienced...”

The evaluation team asked respondents how their businesses adjusted to the challenges associated with the pandemic (Figure L-20). Overall, 86% of surveyed businesses made adjustments due to COVID-19, ranging by segment from 76% of agriculture businesses to 100% of healthcare businesses. Most businesses made health and safety related improvements (55%), with the healthcare (82%), hospitality (71%) and retail (63%) segments being particularly likely to have done so, while agriculture businesses (31%) were the least likely to have made this kind of adjustment.

Most hospitality (68%) and healthcare (59%) businesses reduced building occupancy, but only 14% to 24% of the other targeted segments did so. Of healthcare, hospitality, and retail businesses, 47% to 57% reduced staffing, though few industrial or manufacturing or agriculture businesses did so (both 21%). More than a third of respondents in targeted segments (35% to 40%) increased online orders, shipping, and delivery. This rate was lower for the industrial or manufacturing segment (17%) and other industries (19%).

The most likely segments to improve their properties in response to the pandemic were retail (37%), hospitality (32%), and other industries (38%).

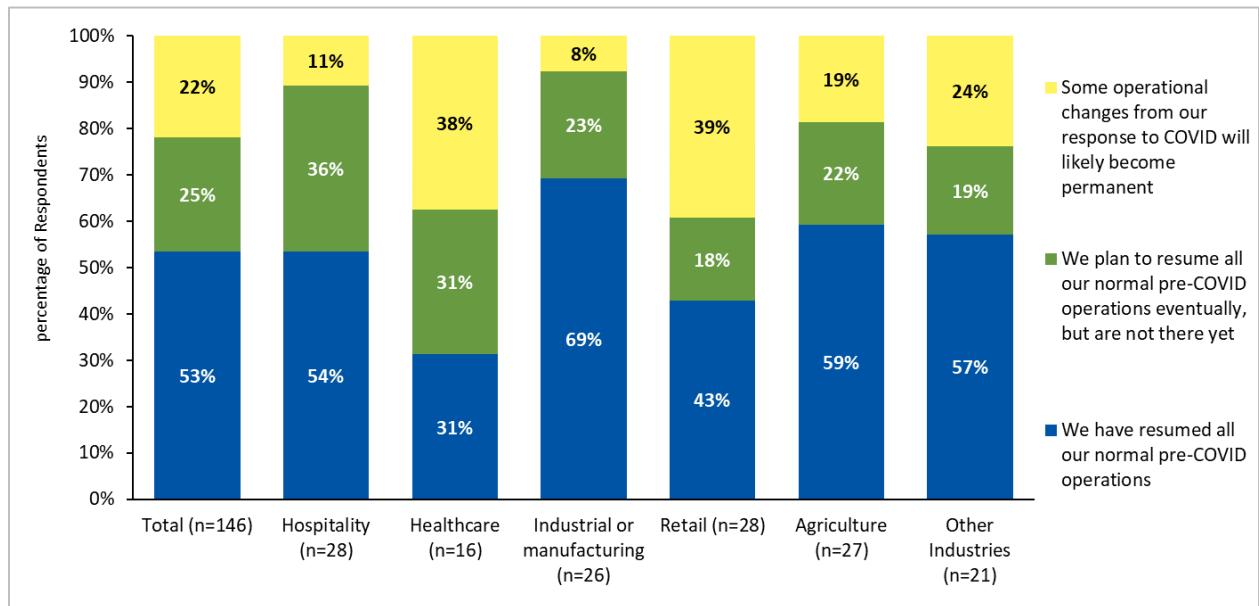
Figure L-20. Business Adjustments Due to the COVID-19 Pandemic



Source: Nonparticipant Survey Question G3. “In what ways did your business adjust to challenges associated with COVID-19?” Multiple responses accepted.

Overall, about half of respondents (53%) said they have resumed their normal pre-COVID-19 operations as of late 2021, though this varied by segment from 69% of industrial or manufacturing businesses to 31% of healthcare businesses (Figure L-21). However, 22% said that some of their operational changes may become permanent, and this was most likely among retail (39%) and healthcare (38%) businesses. Industrial or manufacturing (8%) and hospitality (11%) were the least likely to expect permanent changes to business operations.

Figure L-21. Current Status of Business Operations Affected by the COVID-19 Pandemic



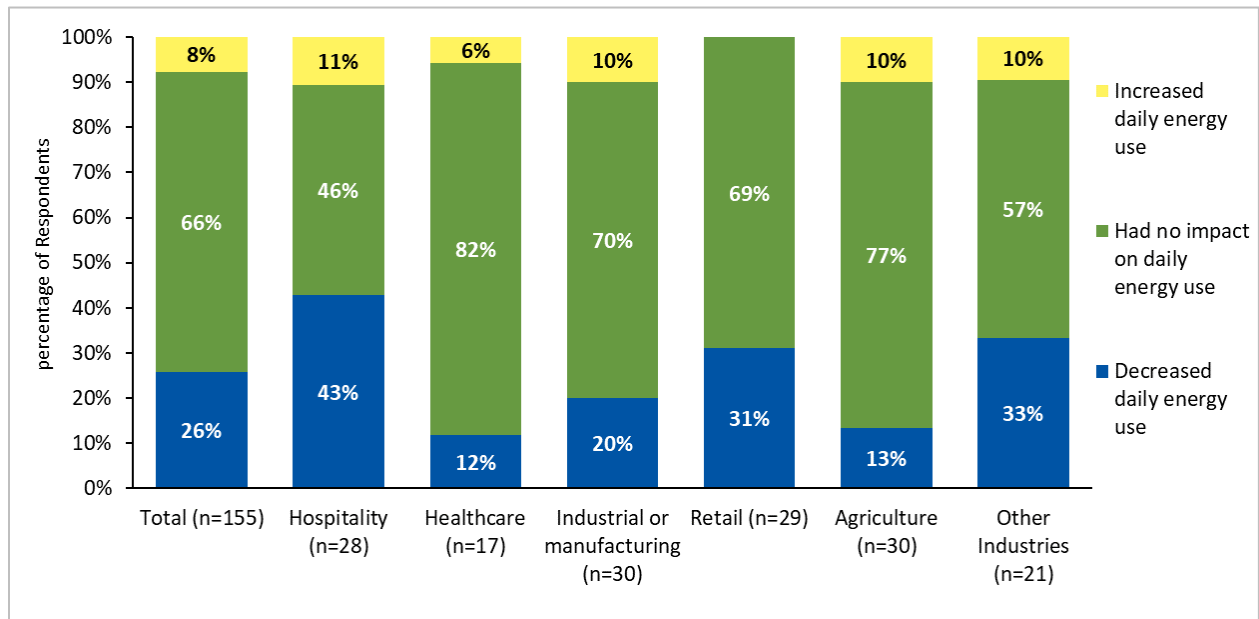
Source: Nonparticipant Survey Question G4. “You indicated that your business operations were affected by the COVID-19 pandemic. Which of the following statements best describes the current state of your business operations?”

The evaluation team asked respondents who were expecting changes to become permanent to specify what those changes were. Responses varied by segment:

- Of three **healthcare** respondents, two mentioned reduced building occupancy; respondents also mentioned reduced staff, reduced hours of operation, and additional cleaning procedures.
- Of 10 **retail** respondents, six mentioned reduced hours of operation; three mentioned contactless interactions with customers (barriers, masks, etc.), two mentioned more cleaning, and there was one mention apiece for reducing staff and adjusting HVAC usage.
- All three **agriculture** respondents mentioned contactless interactions with customers.
- Only two **industrial or manufacturing** businesses expected a permanent change; one mentioned additional cleaning, and one expected increased production and operations.
- Only one **hospitality** business specified an expected permanent change and mentioned increased energy usage.

Sixty-six percent of respondent businesses said their daily energy use did not change due to the pandemic (Figure L-22). The least-affected segments were healthcare (82% had no change) and agriculture (77% had no change). Overall, more businesses reported using less energy during the pandemic (26%) than using more energy (8%), and this was also true for all surveyed segments. The two segments most likely to have seen a decrease in energy use were retail (31% used less, 0% used more) and hospitality (43% used less, 11% used more).

Figure L-22. Effect of the COVID-19 Pandemic on 2020 Energy Use by Segment

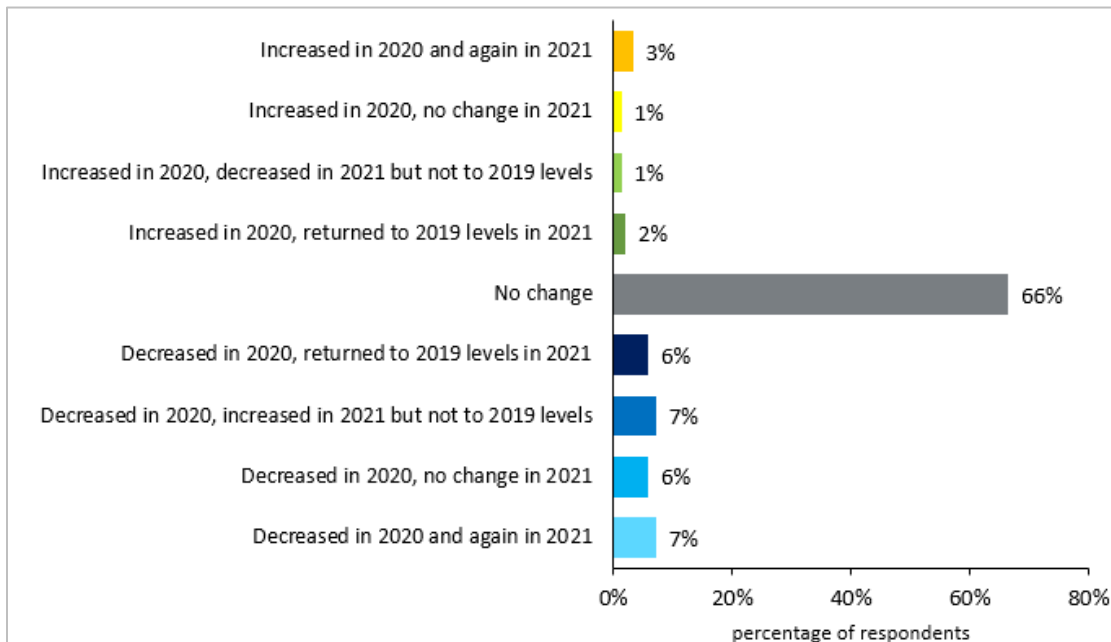


Source: Nonparticipant Survey Question G5. "In what way was your business' daily energy use affected by COVID-19 in 2020?"

Figure L-23 shows how respondents' energy use changed in the second year of the pandemic: 66% reported their energy use did not change during the pandemic, and 8% indicated that their energy usage returned to 2019 levels in 2021. However, 20% of businesses were still using less energy in 2021 than they were in 2019, including 7% who saw a further decrease in 2021 following a decrease in 2020.

The 11 respondents who saw decreases in both years were evenly spread across all segments other than healthcare. Conversely, only five respondents (3%) said their businesses increased energy use in 2020 with a further increase in 2021: these were two industrial or manufacturing businesses, two hospitality businesses, and one agriculture business.

Figure L-23. Effect of the COVID-19 Pandemic on Energy Use in 2020 and 2021



Source: Nonparticipant Survey Questions G5. “In what way was your business’ daily energy use affected by COVID-19 in 2020?” and G6. “Would you say your daily energy use in 2021 has: returned to pre-2020 levels, stayed the same as it was in 2020, or changed to a different level (please describe how it has changed?)” (n=155)

Firmographics

As shown in Table L-2, most respondents had a single location in Wisconsin (76%), heated their facility primarily with gas or propane (75%), and owned their facility (74%). Though firmographics were generally similar between segments, there were a few notable differences. Agriculture (83%) and retail businesses (80%) were the most likely to have a single location, though agriculture respondents were the most likely to own their facility (93%) and retail businesses were the least likely (55%). Industrial or manufacturing businesses tended to have larger facilities (average over 25,000 square feet) and were the most likely to use primarily gas or propane heating (86%). Hospitality businesses tended to have the smallest facilities (average under 6,000 square feet).

Table L-2. Nonparticipant Firmographics

Segment	Sample Size	Single Location in Wisconsin	Average Square Footage	Heat Primarily with Gas or Propane	Own Facility
Hospitality	30	77%	5,917	78%	76%
Healthcare	18	67%	17,417	67%	69%
Industrial or Manufacturing	30	77%	25,344	86%	73%
Retail	30	80%	7,081	77%	55%
Agriculture	30	83%	15,495	69%	93%
Other Industries	22	64%	6,538	68%	75%
Total	160	76%	13,662	75%	74%

Appendix M. Survey and Interview Instruments by Offering

This appendix includes the CY 2021 survey instruments and ongoing participant satisfaction survey questions for several offerings in Focus on Energy’s residential and nonresidential sectors.

Customer Satisfaction Survey Questions

The administrator fielded online customer satisfaction surveys throughout CY 2021. The evaluation team fielded supplementary mail surveys for Trade Ally Solutions and all nonresidential offerings (Business and Industry Solutions, Schools and Government Solutions, and the Nonresidential New Construction Prescriptive offering) during quarter one only.

Table M-1 lists the ratings questions asked in the online and mail satisfaction surveys. All questions were based on a 0 to 10 scale, where 10 indicated the highest satisfaction or likelihood and 0 indicated the lowest satisfaction or likelihood. Four core ratings questions were asked across the surveys:

- **Overall satisfaction:** “Overall, how satisfied are you with your most recent experience with Focus on Energy?”
- **Staff satisfaction:** “How satisfied are you with the [energy advisor or] Focus on Energy staff member who assisted you with your project?”
- **Trade Ally satisfaction (all surveys except Direct To Customer Solutions):** “How satisfied are you with the contractor that [provided your home/business/facility/school or government building upgrades] or [completed your home assessment]?”
- **Likelihood of recommending Focus on Energy:** “How likely are you to recommend Focus on Energy to others?”

Table M-1. CY 2021 Customer Satisfaction Survey Question Matrix: Ratings

Offering Survey	Offering Overall	Staff	Trade Allies	Recommend Focus on Energy	Other Ratings
Direct to Customer ^a	✓	✓	-	✓	✓
Trade Ally Solutions ^b	✓	✓	✓	✓	✓
Business and Industry Solutions	✓	✓	✓	✓	-
Schools and Government Solutions	✓	✓	✓	✓	-
New Construction Solutions: Nonresidential Prescriptive	✓	✓	✓	✓	-
New Construction Solutions: Energy Design Review	✓	✓	✓	✓	-

^a Direct to Customer offerings include Online Marketplace, Farmhouse Kits, Packs, Pop-up Retail, Retail Smart Thermostats, and Rural Retail Events.

^b Trade Ally Solutions offerings include Heating and Cooling, Insulation and Air Sealing, Residential Home Assessments, and Renewable Rewards.

Table M-2 lists the CY 2021 satisfaction survey questions that were not based on a rating. Four additional common questions were asked across surveys:

- **Comments and suggestions:** “Please tell us more about your experience and any suggestions for improvement.”
- **Awareness of utility role:** “The Focus on Energy program you participated in is offered in partnership with your local energy utility. Before taking this survey, was this something you were aware of?”
- **Opinion of utility:** “How have these offerings affected your opinion of your utility, if at all?”
- **Opt-out of follow-up contact:** “On occasion, Focus on Energy staff may follow up with some survey respondents to learn more about their experience with the program. Please indicate below if you do not want someone from Focus on Energy to contact you about this survey.”

Four additional questions were specific to residential and nonresidential offerings:

- **Awareness sources (nonresidential only):** “How did you learn about this particular opportunity from Focus on Energy?”
- **Focus on Energy assistance (nonresidential only):** “Aside from providing project incentive dollars, how can Focus on Energy best support your organization going forward?”
- **Age (residential only):** “Which of the following categories best represents your age?”
- **Income (residential only):** “Which category best describes your total household income before taxes?”
- **Number in household (residential only):** “Counting yourself, how many people live in your household on a full-time basis today? Please include everyone who lives in your home and exclude anyone just visiting or children who may be away at college or in the military.”

Table M-2. CY 2021 Customer Satisfaction Survey Question Matrix: Non-Ratings

Offering Survey	Core Questions						
	Comments and Suggestions	Awareness of Utility Role	Opinion of Utility	Nonresidential		Residential	
				Awareness Source	Focus Assistance	Age	Income
Direct to Customer	✓	✓	✓	-	-	✓	✓
Trade Ally Solutions	✓	✓	✓	-	-	✓	✓
Business and Industry Solutions	✓	✓	✓	✓	✓	-	-
Schools and Government Solutions	✓	✓	✓	✓	✓	-	-
New Construction Solutions: Nonresidential Prescriptive	✓	✓	✓	✓	✓	-	-
New Construction Solutions: Energy Design Review	✓	✓	✓	-	-	-	-

Survey and Interview Instruments

Survey instruments are included at the end of this appendix.

Residential Offerings

- 2021 Residential General Population Survey
- Direct to Customer Solution
 - Online Marketplace Offering – 2021 Participant Survey
- Trade Ally Solutions
 - Renewable Energy Offering – 2021 Participant Survey
 - Renewable Energy Offering – 2021 Trade Ally Interview
- New Construction Solutions
 - Residential New Construction Offering – 2021 Builder Interview

Nonresidential Offerings

- 2021 Nonresidential Nonparticipant General Population Survey
- Commercial Real Estate Owner/Manager In-Depth Interview

Wisconsin Focus on Energy General Population and Limited Income Survey

Target Quota

- General Population: 300
- Limited Income: 150

General Instructions

- General programming instructions for both phone and online surveys are in red **[LIKE THIS]**.
- Phone interviewer instructions are in green **[LIKE THIS]**.
- Online survey instructions are in blue **[LIKE THIS]**.
- Parentheses like this () indicate items that should not be read by the phone interviewer. For online surveys, these answers will appear as response options.
- (Refused) options will only apply to phone surveys; they will not appear for online surveys.

Variables to be pulled into survey

- Contact Name

Introduction

Phone

Hello, my name is **[INSERT NAME]** and I'm calling on behalf of Focus on Energy, Wisconsin's statewide energy efficiency and renewable energy program. Focus on Energy is gathering information to better understand how to help residential customers save money on their utility bills. For this, we are entering eligible respondents into a drawing for a \$100 gift card. May I speak with the person who is most familiar with making energy use decisions for your home?

1. (Yes)
 2. (No refusal) **[THANK AND TERMINATE]**
 3. (Contact not home or unavailable) **[ASK IF RESPONDENT WOULD LIKE TO ARRANGE A MORE CONVENIENT TIME, OR IF THERE IS A DIFFERENT ADULT AVAILABLE THAT WOULD BE WILLING TO TAKE A BRIEF SURVEY. RECORD TIME FOR CALL BACK OR CONTINUE WITH A2 IF NEW CONTACT IS WILLING TO TAKE SURVEY]**
 99. (Refused) **[THANK AND TERMINATE]**
- A2. **[REPEAT A1 IF PHONE WAS HANDED TO ANOTHER RESIDENT]** Focus on Energy is interested in your opinions to help improve their residential energy efficiency programs. Is now a good time to answer some questions on this topic? As a reminder, eligible respondents will be entered to win a \$100 gift card.

1. (Yes)
2. (No, respondent is getting a different person to come to phone) [ASK FOR PERSON'S NAME AND START A2 AGAIN]
3. (No, not a good time) [ASK IF RESPONDENT WOULD LIKE TO ARRANGE MORE CONVENIENT TIME FOR THE SURVEY AND RECORD DETAILS, OR THANK AND TERMINATE IF THEY DO NOT WANT A CALL BACK]
4. (No, refused) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

Great, thank you for participating in our survey.

[THANK AND TERMINATE MESSAGE: WE APPRECIATE YOUR TIME. HAVE A GOOD DAY.]

[ADDITIONAL INFORMATION TO PROVIDE IF NEEDED]

[IF RESPONDENT ASKS WHAT FOCUS ON ENERGY IS] FOCUS ON ENERGY IS WISCONSIN UTILITIES' STATEWIDE ENERGY EFFICIENCY AND RENEWABLE ENERGY PROGRAM. IT HELPS ELIGIBLE RESIDENTS AND BUSINESSES SAVE ENERGY AND MONEY WHILE PROTECTING THE ENVIRONMENT. FOCUS ON ENERGY INFORMATION, RESOURCES, AND FINANCIAL INCENTIVES HELP TO IMPLEMENT ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS THAT OTHERWISE WOULD NOT BE COMPLETED.

[IF RESPONDENT ASKS HOW LONG] SAY: "APPROXIMATELY 10 TO 15 MINUTES."

[IF CUSTOMER IS CONCERNED ABOUT SALES CALL] I AM NOT SELLING ANYTHING, WE ARE INTERESTED IN YOUR OPINIONS TO HELP IMPROVE OUR PROGRAMS AND UNDERSTAND HOW TO ASSIST CUSTOMERS IN SAVING MONEY ON THEIR UTILITY BILLS. YOUR RESPONSES WILL REMAIN CONFIDENTIAL."]

[IF CUSTOMER IS WARY OF THE SURVEY] REASSURE THEM THAT YOU ARE NOT SELLING ANYTHING. IF NECESSARY, PROVIDE CONTACT INFORMATION FOR MITCH HORRIE AT THE PUBLIC SERVICE COMMISSION OF WISCONSIN (608- 267-3206) WHO CAN BE CONTACTED TO CONFIRM VALIDITY OF THE STUDY.]

Online

Email Invitation

To: [EMAIL]

From: Focus on Energy

Subject: Give us your thoughts and you could **win \$100!**

Dear [FIRSTNAME AND LASTNAME],

Focus on Energy, Wisconsin's statewide energy efficiency and renewable energy program, is gathering information to better understand how to help residential customers save money on their utility bills.

Your feedback is vital in ensuring Focus on Energy continues to meet customers' current and future needs.

If you are the person most familiar with making energy use decisions for your home, please take 10-15 minutes to respond to complete this survey.

As our thanks for your time, you will be entered in a drawing to win one of five \$100 VISA gift cards.

Just click the link below to get started.

[auto-generated link]

Your input is very important to us. We'll keep it confidential and only use it for research purposes.

If you have problems with the survey link, please contact the survey coordinator, [survey contact], via email at [email address]. If you would like to confirm the validity of the research effort, please call Mitch Horrie at the Public Service Commission of Wisconsin at (608) 267-3206.

We hope you will take this opportunity to have your voice heard. Thank you in advance for your time and for sharing your experiences.

Introduction

Thank you for participating in our survey! Focus on Energy offers education and financial incentives that help customers save money on their utility bills. This survey will help evaluate and improve its offerings.

Screeners and Demographics

B1. **[ASK ONLINE ONLY]** Are you a person in your household who is familiar with energy use decisions for your home?

1. (Yes)
2. (No) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

THANK AND TERMINATE MESSAGE: Thank you very much for your time.

- B2. To start with, how many people are currently living in your home year-round? [PHONE PROMPT, IF NECESSARY: “Please exclude anyone just visiting or children who may be away at college or in the military.”]
1. (NUMERIC OPEN-END 1-97)
 98. (Don’t know)
 99. (Refused)
- B3. What type of home do you live in? Is it a: **[READ LIST]**
1. Single-family home, detached house
 2. Mobile/manufactured home
 3. Attached house with 1 to 3 units (townhouse, row house, or duplex)
 4. Multifamily apartment or condo building with 4 or more units
 5. Retirement Community or Co-Op
 6. Other [SPECIFY: _____]
 98. (Don’t know)
 99. (Prefer not to say)
- B4. Do you or members of your household own this home, or do you rent?
1. (Own/buying)
 2. (Rent/lease)
 3. (Other [SPECIFY: _____])
 98. (Don’t know)
 99. (Prefer not to say)
- B5. **[IF B4=1]** What is the age of your home?
1. [NUMERIC OPEN-END 1-200]
 98. (Don’t know)
 99. (Refused)
- B6. How long have you lived in your home?
1. (Less than 3 years)
 2. (3 to 5 years)
 3. (6 to 10 years)
 4. (11 to 20 years)
 5. (21 to 30 years)
 6. (More than 30 years)
 7. (Don’t know)
 99. (Refused)
- B7. What is your age range? [PLEASE STOP ME WHEN I GET TO THE CORRECT RANGE]
1. 18-24
 2. 25-34
 3. 35-44

- 4. 45-54
 - 5. 55-64
 - 6. 65-74
 - 7. 75 or older
 - 99. (Prefer not to say)
- B8. What is the highest level of school that someone in your home has completed? **[PLEASE STOP ME WHEN I GET TO THE CORRECT CATEGORY]**
- 1. Less than a high school diploma
 - 2. High school graduate; includes GED
 - 3. Some college, no degree
 - 4. Associates degree
 - 5. Bachelor's degree
 - 6. Graduate or professional degree
 - 98. (Don't know)
 - 99. (Prefer not to say)
- B9. Which category would you say best describes your annual total household income in 2020 before taxes? **[PLEASE STOP ME WHEN I GET TO THE CORRECT CATEGORY]**
- 1. Less than \$20,000
 - 2. \$20,000, up to \$40,000
 - 3. \$40,000, up to \$50,000
 - 4. \$50,000, up to \$65,000
 - 5. \$65,000, up to \$75,000
 - 6. \$75,000, up to \$90,000
 - 7. \$90,000, up to \$100,000
 - 8. \$100,000, up to \$110,000
 - 9. \$110,000, up to \$150,000
 - 10. \$150,000 up to \$200,000
 - 11. \$200,000 or more
 - 98. (Don't know)
 - 99. (Prefer not to say)
- B10. Are you of Hispanic, Latino, or Spanish ethnicity?
- 1. (Yes)
 - 2. (No)
 - 99. (Prefer not to say)
- B11. Which of the following best describes you? **[PLEASE STOP ME WHEN I GET TO THE BEST RESPONSE OR MULTIPLE RESPONSES]**
- 1. Asian
 - 2. Native American or Alaska Native
 - 3. Black or African American

4. Pacific Islander
5. White or Caucasian
6. Other [SPECIFY: _____]
99. (Prefer not to say)

CALCULATE LI VARIABLE FOR QUOTA TRACKING:

- LI = 1 if any of the following apply (qualifies for Limited Income quota):
 - B9 = 1 or 2 (regardless of B2 value)
 - B2 value is 2 and B9 = 3
 - B2 value is 3 and B9 = 3 OR 4
 - B2 value is 4 and B9 = 3 OR 4 OR 5
 - B2 value is 5 and B9 = 3 OR 4 OR 5 OR 6
 - B2 value is 6 OR 7 OR 8 and B9 = 3 OR 4 OR 5 OR 6 OR 7
 - B2 value is 9 TO 97 and B9 = 3 OR 4 OR 5 OR 6 OR 7 OR 8
- LI = 0 if none of the above apply (does not qualify for Limited Income quota)
- LI = 2 if B9 = 98,99 (regardless of B2 value)

Awareness

- C1. Before today, were you aware of Focus on Energy?
 1. (Yes)
 2. (No) **[SKIP TO D6]**
 98. (Don't know) **[SKIP TO D6]**
 99. (Refused) **[SKIP TO D6]**

- C2. We want to understand how much Wisconsin residents know about Focus on Energy. In your own words, what do you think Focus on Energy does? **[IF NEEDED, FOR EXAMPLE, WHAT IS THEIR MISSION? OR WHAT DO THEY OFFER?]**
 1. [RECORD VERBATIM: _____]
 98. (Don't know)
 99. (Refused)

- C3. **[PHONE ONLY]** Which Focus on Energy offerings or rebates, if any, come to mind? **[MULTIPLE RESPONSES ALLOWED, DO NOT READ RESPONSES. NOTE THAT RESPONDENTS MAY NOT REMEMBER THE NAME OF A PROGRAM, SO KEY WORDS THEY MAY REMEMBER ARE INCLUDED AFTER EACH RESPONSE.]**
 1. **(Energy Efficient Packs)** [Other key words: energy-saving packs or kits, light bulb packs or kits]
 2. **(Insulation and Air Sealing)** [Other key words: energy assessments, home audits, weatherization, insulation, Home Performance with ENERGY STAR]
 3. **(Heating and Cooling)** [Other key words: HVAC, furnaces, air-source heat pumps, ground-source heat pumps, geothermal]
 4. **(New Homes)** [Other key words: new construction, building a new home, new build]

- 5. **(Retail)** [Other key words: lighting, lighting discounts, LED bulbs, rebates on light bulbs, smart thermostats, pop-up retail, temporary sale at office/work, appliances]
- 6. **(Focus on Energy Marketplace)** [Other key words: Focus on Energy website selling efficient items, online store]
- 7. **(Renewable Energy)** [Other key words: Solar PV, photovoltaics, solar panels]
- 8. (Other [SPECIFY: _____])
- 98. (Don't Know)
- 99. (Refused)

C4. **[ONLINE ONLY]** For the Focus on Energy offerings listed below, please indicate which ones you are aware of. **[MULTIPLE RESPONSES ALLOWED]**

Offering	Description	I am aware of this offering
Energy Saving Packs	Free packs of energy saving items such as LEDs and low-flow showerheads and faucet aerators, delivered through the mail	
Insulation and Air Sealing	Rebates for weatherizing, with extra rebates for completing an energy assessment	
Heating and Cooling	Rebates for upgrading or replacing your heating and cooling equipment	
New Construction	Rebates for builders to construct homes that meet ENERGY STAR certification standards	
Online Marketplace	Online store available through the Focus on Energy website, offering a range of energy-savings products for your home	
Renewable Energy	Rebates for solar PV installations	
Retail Discounts	Discounts on LEDs or smart thermostats purchased in-store at retail locations across the state, or online from the manufacturer's website	

C5. Have you ever participated in a Focus on Energy offering or received a rebate from Focus on Energy?

- 1. (Yes) **[CONTINUE TO C6]**
- 2. (No) **[SKIP TO C7]**
- 98. (Don't know) **[SKIP TO C7]**
- 99. (Refused) **[SKIP TO C7]**

C6. What Focus on Energy offering did you participate in? **[IF RESPONDENT ISN'T SURE OF OFFERING NAME, ASK IF THEY REMEMBER THE TYPE OF IMPROVEMENT THEY MADE TO THEIR HOME OR EQUIPMENT THEY RECEIVED A REBATE FOR AND RECORD RESPONSE]**

- 1. [RECORD RESPONSE VERBATIM/OPEN-ENDED]
- 98. (Don't know)
- 99. (Refused)

- C7. **[ASK IF RURAL FLAG = YES RURAL AND C1=1. OTHERWISE SKIP TO C8]** Are you aware that Focus on Energy offers a special bonus to residential customers in your area who install a Solar PV system?
1. (Yes)
 2. (No)
 98. (Don't know)
 99. (Refused)
- C8. How have you heard about Focus on Energy's offerings and rebates? **[MULTIPLE RESPONSES ALLOWED]** **[PROMPT: MARKETING TYPE. DO NOT READ RESPONSES.]** **[RANDOMIZE FIRST 11 ITEMS FOR ONLINE SURVEY]**
1. (Mailing - direct mail, brochure, postcard, bill insert, etc.)
 - (i) Who sent the mailing?
 1. (My utility)
 2. (Focus on Energy)
 3. (Another Organization)
 4. (Don't know)
 2. (An email)
 - (i) Who sent the email?
 1. (My utility)
 2. (Focus on Energy)
 3. (Another Organization)
 4. (Don't know)
 3. (A social media app - Facebook, Twitter, LinkedIn, etc.)
 4. (Online ad)
 5. (Internet search)
 - (i) What were you searching for? [SPECIFY: _____]
 6. (A website)
 - (i) Which website?
 1. (My utility)
 2. (Focus on Energy)
 3. (Another Organization)
 4. (Don't know)
 7. (Family / friend / word-of-mouth)
 8. (Focus on Energy representative)
 9. (Utility representative)
 10. (Community or utility event)
 11. (Through participation in another Focus on Energy offering)
 12. (A different source: [SPECIFY: _____])
 98. (Don't know)
 99. (Refused)

Brand Affinity

[ASK QUESTIONS D1 - D5 IF C1=1. OTHERWISE SKIP TO D6]

The following five statements are about Focus on Energy. For each statement, please indicate whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. **[RANDOMIZE THE ORDER OF QUESTIONS D1 TO D5 FOR EACH SURVEY.] [ONLINE VERSION TO BE FORMATTED IN A MATRIX INSTEAD OF SEPARATE QUESTIONS.] [REPEAT RESPONSE OPTIONS AS NEEDED.]**

D1. Focus on Energy is a brand that I can trust.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
98. (Don't know)
99. (Refused)

D2. Focus on Energy offers programs, tools, and services that are valuable.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
98. (Don't know)
99. (Refused)

D3. Focus on Energy provides services and programs that can help me lower my overall energy costs.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
98. (Don't know)
99. (Refused)

D4. Focus on Energy provides services and programs that can help make me more aware of energy-saving opportunities.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
98. (Don't know)
99. (Refused)

D5. My opinion of my energy utility is more favorable because it partners with Focus on Energy to offer energy-efficiency programs to its customers.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree
4. Strongly disagree
98. (Don't know)
99. (Refused)

[PHONE ONLY: IF C1≠1 AND HASN'T ALREADY BEEN STATED, READ] Focus on Energy offers education and financial incentives that help customers save money on their utility bills. This survey will help evaluate and improve its offerings.

D6. The following are four statements about energy efficiency. Please indicate which one is the most important to you when deciding whether to make energy efficient improvements to your home?

[RANDOMIZE LIST, SINGLE RESPONSE.] [READ RESPONSE OPTIONS AND REPEAT AS NEEDED]

1. Energy efficiency saves me money on my utility bills
2. Energy efficiency creates jobs and contributes to the Wisconsin economy
3. Energy efficiency protects the environment by reducing greenhouse gas emissions
4. Energy efficiency makes my home more comfortable.
98. (Don't know)
99. (Refused)

D7. Considering all of your household expenses, how important is reducing your energy bills? Use a scale from 0 to 10, where 0 is "Not at all important" and 10 is "Extremely important."

1. [0-10 LIKERT]
98. (Don't know)

D8. How would you rate your knowledge of different ways you can save energy in your home? Use a scale from 0 to 10, where 0 is "Not at all knowledgeable" and 10 is "Extremely knowledgeable."

1. [0-10 LIKERT]
98. (Don't know)

D9. How energy efficient would you say your home currently is? Use a scale of 0 to 10, where 0 is "Not efficient at all" and 10 is "Extremely efficient."

1. [0-10 LIKERT]
98. (Don't know)

D10. Who do you seek out as a trusted source of information regarding energy efficiency? **[MULTIPLE RESPONSES ALLOWED.] [RANDOMIZE FIRST 11 ITEMS FOR ONLINE SURVEY]**

1. (Friends/family)
2. (Contractor)
3. (Realtor)

4. (Home builder)
5. (Home improvement/hardware store staff)
6. (Utility representative)
7. (Focus on Energy representative)
8. (Utility web site)
9. (Focus on Energy web site)
10. (Newspaper/magazine articles)
11. (Energy-related web sites)
12. (Other) [RECORD RESPONSE VERBATIM_____]
98. (Don't know)
99. (Refused)

Outreach, Motivation, Barriers to Participation

E1. What is the best way for Focus on Energy to let you know about their rebates and services for energy-efficiency improvements? **[RECORD UP TO THREE RESPONSES.] [DO NOT READ RESPONSES.] [RANDOMIZE FIRST 13 ITEMS FOR ONLINE SURVEY.]**

1. (Direct contact with Focus on Energy staff member)
2. (Direct contact with a vendor/contractor)
3. (Focus on Energy mailing)
4. (Email from Focus on Energy)
5. (Focus on Energy website)
6. (Newspaper ad)
7. (Radio ad)
8. (TV ad)
9. (Social Media (e.g., Facebook, Twitter, YouTube))
10. (Online ads)
11. (Utility bill insert)
12. (Direct contact with utility representative)
13. (Community organization) [SPECIFY_____]
14. (Other) [SPECIFY_____]
98. (Don't know)
99. (Refused)

E2. What are the top challenges in completing energy-efficiency improvements for your home? **[ALLOW MULTIPLE RESPONSES] [RANDOMIZE FIRST 9 ITEMS FOR ONLINE SURVEY] [IF NEEDED, "BY ENERGY-EFFICIENCY IMPROVEMENTS, I MEAN INSTALLING ANYTHING THAT WOULD SAVE ENERGY IN YOUR HOME SUCH AS INSULATION AND WINDOWS, EFFICIENT APPLIANCES, EFFICIENT HVAC EQUIPMENT, EFFICIENT LIGHTING, RENEWABLE ENERGY IMPROVEMENTS, SMART THERMOSTATS AND OTHER SIMILAR PRODUCTS."]**

1. (Upfront cost/Initial cost of investment)
2. (Lack of knowledge about what improvements are needed)

3. (Lack of time to plan/complete projects)
 4. (Don't understand benefits of these improvements)
 5. (Believe that home is already efficient)
 6. (Don't have reliable contractor/installer)
 7. (My house is too old)
 8. (Don't own the home/renting the home)
 9. (My house doesn't need energy-efficiency improvements)
 10. (Other) [RECORD VERBATIM _____]
 98. (Don't know)
 99. (Refused)
- E3. **[ASK IF 2 OR MORE ITEMS CHECKED IN E2]** Of the challenges you just named regarding completing energy-efficiency improvements for your home, which one would you say is the biggest challenge? **[IF NEEDED, READ RESPONSES AGAIN]**
1. **[INSERT ALL ITEMS CHECKED IN E2]**
 98. (Don't know)
 99. (Refused)
- E4. **[ASK IF C1=2, 98 OR 99 OR IF C45=2]** What are the reasons you have not participated in a Focus on Energy program? **[ALLOW MULTIPLE RESPONSES] [RANDOMIZE FIRST 12 ITEMS FOR ONLINE SURVEY] [DO NOT READ LIST]**
1. (Haven't purchased anything or made any improvements that I think would qualify for a Focus on Energy rebate)
 2. (I believe my home is as energy efficient as it can be)
 3. (I don't know what equipment or offerings are available for rebates)
 4. (I don't have time to collect and complete the required paperwork)
 5. (I don't understand the technical aspects of the application paperwork, I need help completing the application)
 6. (English is not my first language, I need help translating the information)
 7. (I don't have enough money for any new equipment)
 8. (I don't have enough money for the initial investment of qualified equipment)
 9. (There are not contractors close enough to me to do the installation and/or repairs)
 10. (I don't own the home/I'm renting the home)
 11. (My home needs repairs first/Other improvements are a higher priority)
 12. (I am unwilling to provide financial information that is required on the paperwork)
 13. (Other) [RECORD VERBATIM _____]
 98. (Don't know)
 99. (Refused)

Limited Income (all respondents answer this section)

- F1. Using a scale of 0 to 10, where 0 is “not at all important” and 10 is “extremely important,” please rate how important each of the following statements is when considering an energy efficiency improvement in your home: **[RANDOMIZE LIST]**
1. Maximizing the comfort of my home
 2. Making sure my home is safe and a healthy environment
 3. Reducing my impact on the environment
 4. Reducing my energy bills
- F2. In the past three years, have you been contacted by Focus on Energy, a government agency, community organization, or a utility regarding participation in an energy efficiency program?
1. (Yes)
 2. Who contacted you? [OPEN-ENDED RESPONSE; Not sure]
 3. (No)
 98. (Don’t know)
- F3. **[ASK IF B4=2]** What utility bills are you responsible for?
1. (Electric)
 2. (Gas)
 3. (Water)
 4. (Sewer)
 5. (Other: [OPEN-ENDED RESPONSE])
- F4. When thinking about both hot summer months and cold winter months, on a scale of 0 to 10, where 0 is “Not at all a burden” and 10 is “Extreme burden,” how big of a financial burden would you say your utility bills are?
1. [0-10 LIKERT]
 98. (Don’t know)
 99. (Refused)
- F5. **[IF B4=2, and B6=2-6]** Has your landlord or property manager made any energy efficiency upgrades to your residence (including any common areas) since you have lived there?
1. (Yes)
 2. Where were the upgrades made? **[allow multiple responses]**
 3. A unit/specific home
 4. Common area/whole building
 5. (No)
 98. (Don’t know)
- F6. **[IF B4=2, and B6=1]** Has your landlord or property manager made any energy efficiency upgrades to your residence (including any common areas) in the last two years?
1. (Yes)

2. Where were the upgrades made? **[allow multiple responses]**
 3. A unit/specific home
 4. Common area/whole building
 5. (No)
 98. (Don't know)
- F7. How helpful would the following Focus on Energy services be to you? Use a scale from 0-10, with 0 being "not at all helpful" and 10 being "extremely helpful." **[MULTIPLE RESPONSES ALLOWED; RANDOMIZE LIST]**
1. Education about ways to make my home more comfortable
 2. Rebates on equipment or services that would make my home more comfortable
 3. Rebates on equipment or services that would help save money on my energy bills
 4. Quick access to easy-to-install energy-saving products that I can install myself
 5. Installation by a contractor of products that will help me save energy in my home
 6. Education about what items in my home use the most energy
 7. Education about easy ways to save energy in my daily life
 8. An audit of my home that would tell me how to make it more efficient
 9. Support for understanding what offerings and rebates are available to me
 10. Support to find Focus on Energy partners (contractors, retailers, etc.)
 11. Support for completing Focus on Energy applications
 12. Ways to help others in my community save energy as well
- F8. **[IF F7=11]** What support could Focus on Energy provide to help complete the application?
1. [RECORD VERBATIM/OPEN-ENDED RESPONSE]
- F9. Are there any other ways Focus on Energy can support you to improve the energy efficiency of your home?
1. [RECORD VERBATIM/OPEN-ENDED RESPONSE]
- F10. Assuming Focus on Energy offered services that met your needs, how likely would you be to participate in a Focus on Energy offering? Use a scale where 0 is "Not at all likely" and 10 is "Extremely likely."
1. [0-10 LIKERT]
- F11. **[IF F10 RATING IS <5]** Why would you be unlikely to participate?
1. [RECORD VERBATIM/OPEN-ENDED RESPONSE]

Smart Device Saturation

The following questions are about smart devices in your home. A smart device is a device that is connected to wireless internet, or Wi-Fi, and can be controlled by a mobile device.

- G1. Do you have Wi-Fi, in your home?
1. (Yes)
 2. (No) **[SKIP TO SECTION H]**

98. (Don't know) **[SKIP TO SECTION H]**
99. (Refused) **[SKIP TO SECTION H]**
- G2. Do you have a Wi-Fi connected smart thermostat in your home? Some examples are Nest, Ecobee, and Honeywell Lyric.
1. (Yes)
 2. (No)
98. (Don't know)
99. (Refused)
- G3. Do you have any Wi-Fi connected smart light bulbs in your home? Smart light bulbs can be turned on and off or scheduled remotely with a mobile device.
1. (Yes)
 2. (No)
98. (Don't know)
99. (Refused)
- G4. **[ASK IF G3=1, OTHERWISE SKIP TO G5]** How many smart light bulbs do you have installed in your home? An approximate number is fine.
1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)
- G5. Do you have any of the following other smart devices in your home? **[MULTIPLE RESPONSES ALLOWED] [RANDOMIZE LIST] [READ RESPONSES]**
1. Smart speaker such as Amazon Echo/Alexa, Google Home, or Apple HomePod
 2. Smart home security/surveillance cameras
 3. Smart door locks such as such as August or Schlage Sense
 4. Video doorbell such as Ring or August
 5. Smart television
 6. Smart refrigerator
 7. Another smart device [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

Nonparticipant Spillover

The following questions are about energy-efficient improvements or energy-efficient equipment that might affect your home's energy use.

- H1. In the past year, did you purchase or install any energy-efficient equipment or upgrades at your residence for which you did not receive a Focus on Energy rebate?
1. (Yes)
 2. No) **[SKIP TO I1]**

- 98. (Don't know) **[SKIP TO I1]**
- 99. (Refused) [SKIP TO I1]

H2. Which of the following types of energy efficient improvements, products, or equipment did you install in the past year? **[ACCEPT MULTIPLE RESPONSES]**

- 1. LEDs
- 2. Central air source heat pump
- 3. Ductless / mini-split heat pump
- 4. Ground source / geothermal heat pump
- 5. Central air conditioner
- 6. Furnace
- 7. Boiler
- 8. Water heating equipment
- 9. ENERGY STAR refrigeration equipment (refrigerators, freezers)
- 10. ENERGY STAR air purifier
- 11. Insulation
- 12. Air sealing
- 13. Duct sealing
- 14. Smart or Wi-Fi enabled thermostat
- 15. Recycled a working refrigerator or freezer
- 16. Other [SPECIFY: _____]
- 98. (Don't know)
- 99. (Refused)

[ASK H3-H6 IF H2=1]

H3. What is the wattage of the lighting you installed?

- 1. [OPEN-ENDED RESPONSE]
- 98. (Don't know)
- 99. (Refused)

H4. In what location(s) was the lighting installed? **[ACCEPT MULTIPLE RESPONSES]** **[DO NOT READ LIST]**

- 1. Living Room
- 2. Kitchen
- 3. Bedroom
- 4. Bathroom
- 5. Garage
- 6. Outside
- 7. Other [SPECIFY: _____]
- 98. (Don't know)
- 99. (Refused)

- H5. What type of lighting was removed or replaced? [ACCEPT MULTIPLE RESPONSES] [READ LIST IF NEEDED]
1. Incandescent
 2. Halogen
 3. CFL
 4. LED
 98. (Don't know)
 99. (Refused)
- H6. How did you learn that the new lighting is energy-efficient?
1. [RECORD RESPONSE]
- H7. [ASK IF H2=2] What is the heating efficiency performance factor (HSPF) rating, cooling seasonal energy efficiency ratio (SEER), and capacity (in BTUs) of the central air source heat pump?
1. Heating efficiency rating: [RECORD RESPONSE]
 2. Cooling efficiency ratio: [RECORD RESPONSE]
 3. Capacity in BTUs: [RECORD RESPONSE]
 98. (Don't Know)
 99. (Refused)
- H8. [ASK IF H2=3] What is the heating efficiency performance factor (HSPF) rating, cooling seasonal energy efficiency ratio (SEER), and capacity in BTUs of the ductless heat pump?
1. Heating efficiency rating: [RECORD RESPONSE]
 2. Cooling efficiency ratio: [RECORD RESPONSE]
 3. Capacity in BTUs: [RECORD RESPONSE]
 98. (Don't Know)
 99. (Refused)
- H9. [ASK IF H2=4] What is the heating efficiency performance factor (HSPF) rating, cooling seasonal energy efficiency ratio (SEER), and capacity in BTUs of the ground source heat pump?
1. Heating efficiency rating: [RECORD RESPONSE]
 2. Cooling efficiency ratio: [RECORD RESPONSE]
 3. Capacity in BTUs: [RECORD RESPONSE]
 98. (Don't Know)
 99. (Refused)
- H10. [ASK IF H2=5] What is the cooling seasonal energy efficiency ratio (SEER) and capacity in BTUs of the central air conditioner?
1. Cooling efficiency ratio: [RECORD RESPONSE]
 2. Capacity in BTUs: [RECORD RESPONSE]
 98. (Don't Know)
 99. (Refused)

H11. **[ASK IF H2=6]** What is the annual fuel utilization efficiency (AFUE) rating and capacity in BTUs of the furnace?

1. Annual fuel utilization efficiency (AFUE) rating: [RECORD RESPONSE]
2. Capacity in BTUs: [RECORD RESPONSE]
98. (Don't Know)
99. (Refused)

H12. **[ASK IF H2=7]** What is the annual fuel utilization efficiency (AFUE) rating and capacity in BTUs of the boiler?

1. Annual fuel utilization efficiency (AFUE) rating: [RECORD RESPONSE]
2. Capacity: [RECORD RESPONSE]
98. (Don't Know)
99. (Refused)

H13. **[ASK IF H2=2-7]** How did you learn the new heating/cooling equipment is energy-efficient?

1. [RECORD RESPONSE]
98. (Don't Know)
99. (Refused)

[ASK H14-H18 IF H2=8]

H14. What type of water heating equipment was purchased and installed? **[SINGLE RESPONSE]**

[READ LIST IF NEEDED]

1. Tankless on-demand water heater
2. Conventional storage tank water heater
3. Heat pump water heater
4. Boiler
5. Condensing water heater
6. Other [SPECIFY: _____]
98. (Don't know)
99. (Refused)

H15. What is the thermal efficiency factor (EF) rating of the water heating equipment?

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

H16. **[ASK IF H14≠1]** What is the water heater capacity in gallons?

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

H17. **[ASK IF H14≠3, 4]** What fuel type does the water heating equipment use?

1. [RECORD RESPONSE]

- 98. (Don't Know)
- 99. (Refused)

H18. How did you learn the new water heating equipment is energy-efficient?

- 1. [RECORD RESPONSE]
- 98. (Don't Know)
- 99. (Refused)

[ASK H19-H20 IF H2=9]

H19. What type of refrigeration equipment was purchased and installed? **[ACCEPT MULTIPLE RESPONSES]** **[READ LIST IF NEEDED]**

- 1. Refrigerator
- 2. Freezer
- 3. Refrigerator/freezer combined unit
- 98. (Don't know)
- 99. (Refused)

H20. How did you learn the new refrigeration equipment is energy-efficient?

- 1. [RECORD RESPONSE]
- 98. (Don't Know)
- 99. (Refused)

H21. [ASK IF H2=10] How did you learn the new air purifying equipment is energy-efficient?

- 1. [RECORD RESPONSE]
- 98. (Don't Know)
- 99. (Refused)

[ASK H22-H23 IF H2=11]

H22. What is the R-value efficiency rating of the insulation installed?

- 1. [RECORD RESPONSE]
- 98. (Don't know)
- 99. (Refused)

H23. How did you learn the new insulation is energy-efficient?

- 1. [RECORD RESPONSE]
- 98. (Don't Know)
- 99. (Refused)

[ASK 0-H26 IF H2=14]

H24. Is the thermostat you installed just programmable or is it also Wi-Fi enabled?

1. Programmable but not Wi-Fi enabled
2. Wi-Fi enabled
98. (Don't know)
99. (Refused)

H25. **[ASK IF H24=2]** Is the thermostat you installed a Smart thermostat? **[READ DEFINITION IF NECESSARY: A SMART THERMOSTAT IS WI-FI CAPABLE AND CONNECTED TO THE HOME. IT HAS THREE OF THE FOLLOWING LISTED FEATURES: OCCUPANCY SENSORS, PROXIMITY SENSING, BEHAVIOR OR LEARNING FEATURES, BASIC DEMAND RESPONSE CAPABILITY.]**

1. Yes [SPECIFY MANUFACTURER]
2. No
98. (Don't know)
99. (Refused)

H26. How did you learn the new thermostat is energy-efficient?

1. [RECORD RESPONSE]
98. (Don't Know)
99. (Refused)

[ASK H27-H28 IF H2=15]

H27. Did you recycle a refrigerator or a freezer?

1. Refrigerator
2. Freezer
3. Both refrigerator and freezer
98. (Don't know)
99. (Refused)

H28. How many did you recycle?

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

H29. How many of the following types of energy efficient improvements, products or equipment did you install in the past year? **[RECORD QUANTITY OF EACH] [NUMERICAL INPUT 0-99997, 99998 = (Don't Know), 99999 = (Refused)]**

Equipment	Quantity
[DISPLAY IF H2=1] LEDs (record number of bulbs)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=2] Central air source heat pumps (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=3] Ductless / mini-split heat pumps (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=4] Ground source / geothermal heat pumps (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=5] Central air conditioners (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=6] Furnaces (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=7] Boilers (record number of units)	[NUMERIC TEXT BOX]

Equipment	Quantity
[DISPLAY IF H2=8] Water heaters (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=9] ENERGY STAR Refrigerators/freezers (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=10] ENERGY STAR Air purifiers (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=11] Insulation (record square feet)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=112] Air sealing (record linear feet)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=13] Duct sealing (record linear feet)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=14] Programmable or Wi-Fi-enabled thermostats (record number of units)	[NUMERIC TEXT BOX]
[DISPLAY IF H2=16] Other equipment: [PIPE IN ANSWER FROM H2.16] (record number of units)	[NUMERIC TEXT BOX]

- H30. [REPEAT FOR EACH ITEM MENTIONED IN H2] In what year was the [INSERT ITEM FROM H2] purchased and installed?
[RECORD NUMERIC YEAR: "2021","2020","2019"..., 99 FOR DON'T KNOW, 88 FOR REFUSED, AND -96 FOR N/A]
- H31. Did you know that your purchase(s) might have been eligible for a rebate or discount from Focus on Energy at the time of the purchase?
1. Yes
 2. No
 98. (Don't know)
 99. (Refused)
- H32. Why did you not apply for a discount or rebate?
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)
- H33. **[REPEAT FOR EACH ITEM MENTIONED IN H2]** How important were each of the following in your decision to purchase and install the energy-efficient products? Please use a scale from 1, meaning "not at all important", to 5, meaning the item was "very important" to your decisions.
1. [ASK IF H2=1] How important were each of the following on your decision to purchase the LEDs?
 2. **[ASK IF H2=2]** How important were each of the following on your decision to purchase the central air source heat pump(s)?
 3. **[ASK IF H2=3]** How important were each of the following on your decision to purchase the ductless heat pump(s)?
 4. **[ASK IF H2=4]** How important were each of the following on your decision to purchase the ground source heat pump(s)?
 5. **[ASK IF H2=5]** How important were each of the following on your decision to purchase the central air conditioner(s)?
 6. **[ASK IF H2=6]** How important were each of the following on your decision to purchase the furnace(s)?

7. **[ASK IF H2=7]** How important were each of the following on your decision to purchase the boiler(s)?
8. **[ASK IF H2=8]** How important were each of the following on your decision to purchase the water heater(s)?
9. **[ASK IF H2=9]** How important were each of the following on your decision to purchase the refrigerator(s)/freezer(s)?
10. **[ASK IF H2=10]** How important were each of the following on your decision to purchase the air purifier(s)?
11. **[ASK IF H2=11]** How important were each of the following on your decision to purchase the insulation?
12. **[ASK IF H2=12]** How important were each of the following on your decision to have the air sealing performed?
13. **[ASK IF H2=13]** How important were each of the following on your decision to have the duct sealing performed?
14. **[ASK IF H2=14]** How important were each of the following on your decision to purchase the programmable or Wi-Fi-enabled thermostat(s)?
15. **[ASK IF H2=15]** How important were each of the following on your decision to recycle the refrigerator(s)/freezer(s)?
16. **[ASK IF H2=16]** How important were each of the following on your decision to purchase the other equipment?

Item	Not at all important (1)	(2)	(3)	(4)	(5)	Don't know (98)	Not applicable (96)
a. Replace old or broken equipment							
b. Reduce energy consumption or energy demand							
c. General information about energy efficiency provided by Focus on Energy							
e. Information from friends or family members who installed energy efficient equipment and received a rebate from Focus on Energy							
f. Energy efficiency savings information from a Federal, state or local government website or agency							
g. Previous participation in a Focus on Energy offering over a year ago							

H34. Was there anything else that was important in your decision to purchase and install energy efficient equipment: **[ONLY DISPLAY OPTIONS SELECTED IN H2]**

1. LEDs [TEXT ENTRY]
2. Central air source heat pump [TEXT ENTRY]
3. Ductless / mini-split heat pump [TEXT ENTRY]
4. Ground source / geothermal heat pump [TEXT ENTRY]
5. Central air conditioner [TEXT ENTRY]
6. Furnace [TEXT ENTRY]
7. Boiler [TEXT ENTRY]
8. Water heating equipment [TEXT ENTRY]
9. ENERGY STAR refrigeration equipment (refrigerators, freezers) [TEXT ENTRY]
10. ENERGY STAR air purifier [TEXT ENTRY]
11. Insulation [TEXT ENTRY]
12. Air sealing [TEXT ENTRY]
13. Duct sealing [TEXT ENTRY]
14. Programmable or Wi-Fi enabled thermostat [TEXT ENTRY]
15. Recycled a working refrigerator or freezer [TEXT ENTRY]
16. Other [SPECIFY: _____]
98. (Don't Know)
99. (Refused)

H35. Thinking about energy-saving improvements that might still need to be done in your home, what do you think is the most important improvement to help save energy?

1. [RECORD VERBATIM/OPEN-ENDED RESPONSE]
2. (None)
98. (Don't know)

H36. The following is a list of energy-saving actions. Please indicate if you regularly perform these actions in your home. **[OPTIONS FOR EACH: YES (regularly perform), NO, DON'T KNOW] [READ RESPONSES] [RANDOMIZE OPTIONS, PROGRAM AS A MATRIX.]**

1. Adjust heating or cooling to save energy
2. Reduce water heater temperature to save energy
3. Wash clothes in cold water
4. Wash full loads of clothes
5. Wash full dishwasher loads
6. Turn off lights in unused areas
7. Unplug or shut down electronics when not in use
8. Maintain heating equipment for more efficient operation

COVID-19

The final questions are about how COVID-19 may have affected energy use in your home

11. Are members of your household working at home more, less, or about the same as before the COVID-19 pandemic?
 1. (Working at home more)
 2. (Working at home less)
 3. ((Working at home about the same)
 4. (Does not apply)
 98. (Don't know)

12. Using a scale from 1 to 5, where 1 is "significantly decreased" and 5 is "significantly increased," please rate any changes to how energy is used in your home now compared to before COVID-19.
 1. Heating
 2. Cooling
 3. Lighting
 4. Water heating/use
 5. Home office equipment
 6. Television and audio equipment
 7. Kitchen appliances
 8. Laundry
 9. Electric home gym equipment
 10. Electric home medical equipment

13. **[If B4=1]** Have you delayed any energy efficiency upgrades due to COVID-19?
 1. (Yes)
 2. (No)
 98. (Don't know)

14. **[If B4=1]** Have you completed any energy efficiency upgrades sooner than you otherwise would have due to COVID-19?
 1. (Yes)
 2. (No)
 98. (Don't know)

15. **[If B4=2]** Have you or your landlord delayed any energy efficiency upgrades due to COVID-19?
 1. (Yes)
 2. (No)
 98. (Don't know)

16. **[If B4=2]** Have you or your landlord completed any energy efficiency upgrades sooner than you otherwise would have due to COVID-19?
1. (Yes)
 2. (No)
 98. (Don't know)
17. **[IF I3=1 OR I5=1]** What upgrades were delayed due to COVID-19?
1. [OPEN-ENDED RESPONSE]
 2. Why were they delayed? **[OPEN-ENDED RESPONSE]**
18. **[IF I4=1 OR I6 = 1]** What upgrades were COMPLETED SOONER due to COVID-19?
1. [OPEN-ENDED RESPONSE]
 2. Why were they delayed? **[OPEN-ENDED RESPONSE]**
19. Would you say that your household income changed due to the effects of COVID-19?
1. Yes, it has increased significantly
 2. Yes, it has increased somewhat
 3. No, it has not changed
 4. Yes, it has decreased somewhat
 5. Yes, it has decreased significantly
 6. Prefer not to say
 98. (Don't know)

This completes the survey.

110. Are you interested in entering a drawing for one of five \$100 gift cards?
1. (Yes) [Enter verbatim name and mailing address for the gift card]
 2. (No)

Thank you very much for taking the time to provide your input. Focus on Energy appreciates your participation.

Wisconsin Focus on Energy – Online Marketplace Offering 2021 Participant Survey

Estimated survey launch: October 2021

Survey format: Online

Target Quotas:

Measure	Total Participants through July 2021	Minimum Target
Smart Thermostats	2,441	General target: 70 per measure/LTO pack Est 10-20% response rate
Advanced Power Strip (Tier 1 &2)	360	
LED Omni-directional (non-LTO)	2,003	
LED Globe (non-LTO)	205	
LED Decorative (non-LTO)	194	
LED Omni 3-way (non-LTO)	346	
LED Reflectors	676	
Showerhead (non-LTO)*	258	
Showerstart*	40	
Faucet aerator (kitchen and bath, non-LTO)	173	
LTO Bath Pack (1 faucet aerator, 1 showerhead, 8 globe LEDs)	4,166 (>5,000 through August)	
LTO Kitchen Pack (10 reflector LEDs, 1 kitchen aerator, hot water temperature card, pipe insulation)	(>1,600 through August)	

*Combine showerstart and showerhead results

General Instructions:

- Survey programming instructions are in red **[LIKE THIS]**
- Core residential questions are indicated with an asterisk (*). These questions have been previously approved by the Wisconsin PSC and APTIM.
- All questions are single-response unless specified otherwise.
- All questions are forced response, unless specified otherwise.

Variables to be Included in Sample:

EMAIL

FIRSTNAME

LASTNAME

CADMUS_ACCOUNT_KEY

MEASURE=

- **“smart thermostat” [TSTAT],**
- **“smart power strip” [APS],**
- **“LED” [LED]**

- “showerhead” [SHWR]
- “faucet aerator” [AER]
- “Bathroom Bundle” [LTO_BATH]
- “Efficient Kitchen Product Bundle” [LTO_KTN]

QTY_TSTAT

QTY_APS

QTY_LED

QTY_SHWR

QTY_AER

QTY_HWTC

QTY_PW

LTO_BATH = number of kits; measure QTYs will also be >0 for kit items

LTO_KTN = number of kits; measure QTYs will also be >0 for kit items

MEASURE quantities for LTOs:

- Each 1 Unit LTO_BATH = 1 aerator, 1 showerhead and 8 globe LEDs
- Each 1 Unit LTO_KTN = 10 reflector LEDs, 1 aerator, 1 hot water temperature card, 1 pipe wrap

MONTH (of participation)

Email Invitation

To: [EMAIL]

From: Focus on Energy Feedback

Subject: Are you enjoying your new [MEASURE](s)? Let us know and you could **win \$100!**

Dear [FIRSTNAME AND LASTNAME],

We hope you are enjoying the new [MEASURE](s) you purchased from the Focus on Energy Online Marketplace.

Our offerings are designed to help you and your family make smart choices to manage your energy use. That's why we invite you to share **your important feedback** on your recent experience with Focus on Energy, by taking our brief survey.

The survey will take about 10 minutes to complete. **As our thanks for completing the survey, we will enter you in a drawing to win a \$100 VISA gift card.**

Just click the link below to get started.

[auto-generated link]

Your input is very important to us and will be kept confidential and only used for research purposes.

If you have problems with the survey link, please contact the survey coordinator, *[survey contact]*, via email at *[email address]*. If you would like to confirm the validity of the research effort, please call Mitch Horrie at the Public Service Commission of Wisconsin at (608) 267-3206.

We hope you will take this opportunity to have your voice heard. Thank you in advance for your time and for sharing your experiences.

Reminder Invitation

To: *[EMAIL]*

From: Focus on Energy Feedback

Subject: There's still time to give Focus on Energy feedback and win \$100!

Dear *[FIRSTNAME AND LASTNAME]*,

We recently invited you to tell us about your experience using the Focus on Energy Online Marketplace. We would still like to hear from you – **your input is very important to us!** We use the information from participants like you to continue to improve our programs.

Please take about 10 minutes to complete our survey. **As our thanks for completing the survey, we will enter you in a drawing to win a \$100 VISA gift card.**

Just click the link below to get started.

[auto-generated link]

Your input is very important to us and will be kept confidential and only used for research purposes.

If you have problems with the survey link, please contact the survey coordinator, *[survey contact]*, via email at *[email address]*. If you would like to confirm the validity of the research effort, please call Mitch Horrie at the Public Service Commission of Wisconsin at (608) 267-3206.

We hope you will take this opportunity to have your voice heard. Thank you in advance for your time and for sharing your experiences.

A. Survey Introduction and Screener

[FOCUS ON ENERGY LOGO TO APPEAR ON START SCREEN]

Welcome! Thank you for sharing your experience with Focus on Energy.

Records from Focus on Energy show that you purchased *[MEASURE]*(s) from the Focus on Energy Online Marketplace in *[MONTH]* 2021.

The following survey will ask about your satisfaction with your *[MEASURE]*(s) and about why you made your purchase. At the end, you will be given the opportunity to enter to win a \$100 Visa gift card as a token of our appreciation for your time.

[SCREEN OUT TERMINATION MESSAGE:] Those are all the questions we have. Thank you.

- A1. Did you purchase new **[MEASURE]**(s) in 2021 from the Focus on Energy Online Marketplace?
1. Yes
 2. No **[TERMINATE]**
 98. I'm not sure **[TERMINATE]**
- A2. Do you recall that you received a discount on the purchase price from Focus on Energy?
1. Yes
 2. No **[TERMINATE]**
 98. I'm not sure **[TERMINATE]**

B. Awareness

- B1. *Where have you heard about Focus on Energy discounts for **[MEASURE]**s available through the Online Marketplace? **[RANDOMIZE ITEMS 1-11, MULTIPLE RESPONSES ALLOWED]**
1. Mailing (direct mail, brochure, postcard, bill insert, etc.)
 - a. **Who sent the mailing?**
 1. My utility
 2. Focus on Energy
 3. Another Organization
 4. I'm not sure
 2. An email
 - a. **Who sent the email?**
 1. My utility
 2. Focus on Energy
 3. Another Organization
 4. I'm not sure
 3. A social media app (Facebook, Twitter, LinkedIn, etc.)
 4. Online ad
 5. Internet search
 - a. **What were you searching for? [SPECIFY]**
 6. A website
 - a. **Which website?**
 1. My utility
 2. Focus on Energy
 3. Another Organization
 4. I'm not sure
 7. Family / friend / word-of-mouth
 8. Focus on Energy representative
 9. Utility representative
 10. Community or utility event
 11. Through participation in another Focus on Energy offering

- 12. A different source – what was it? **[SPECIFY]**
- 98. I’m not sure **[EXCLUSIVE]**

B2. *What is the best way for Focus on Energy to inform people about energy efficiency offerings?

[RANDOMIZE ITEMS 1-12, MULTIPLE RESPONSE]

- 1. Promotion through other Focus on Energy offerings
- 2. Television
- 3. Radio
- 4. Print media, such as magazine, newspaper article or advertisement
- 5. Billboard / outdoor ad
- 6. Direct mail / brochure / postcard
- 7. Family / friend / word-of-mouth
- 8. Email from Focus on Energy
- 9. Focus on Energy or Utility website
- 10. Community or utility event
- 11. Other website - which one? **[SPECIFY]**
- 12. Social Media such as Twitter, Facebook, or Instagram
- 13. A different source – which one? **[SPECIFY]**
- 14. I do not want to receive information **[EXCLUSIVE]**
- 98. I’m not sure **[EXCLUSIVE]**

B3. *Other than Focus on Energy’s Online Marketplace, are you aware of any other Focus on Energy offerings or rebates?

- 1. Yes
- 2. No
- 98. I’m not sure

B4. **[ASK IF B3=1]** *For the Focus on Energy offerings and rebates listed below, please indicate which ones you are aware of, and which you have participated in. **[TABLE FORMAT; EACH OFFERING LISTED HAS A DROP DOWN MENU WITH THE THREE OPTIONS BELOW]**

- 1. Participated in this offering
- 2. Aware but have not participated
- 3. Not aware of this offering

Offering	Description
Energy Saving Packs	Free packs of energy saving items such as LEDs and efficient showerheads and faucet aerators, delivered through the mail
Insulation and Air Sealing	Incentives for weatherizing your home, with extra incentives for completing an energy assessment
Heating and Cooling	Incentives for upgrading or replacing your heating and cooling equipment
New Construction	Incentives for builders to construct homes that meet ENERGY STAR certification standards
Renewable Energy	Incentives for solar PV installations
LED/Smart Thermostat Discounts	Discounts on LEDs or smart thermostats purchased in-store at retail locations across the state, or online from the manufacturer’s website

C. Motivation

- C1. *What was the most important reason you purchased your **[MEASURE](s)**? **[SINGLE RESPONSE, RANDOMIZE ITEMS 1-11.]**
1. Save energy and be more energy efficient
 2. Reduce utility bill
 3. Good for the environment
 4. Recommended by a friend / relative
 5. Recommended by retailer, dealer, or contractor
 6. Discount from Focus on Energy
 7. Recommended by Focus on Energy or my utility
 8. Wanted the latest technology
 9. **[IF MEASURE IS NOT “LTO”] [MEASURE]** had features my old **[MEASURE]** did not have
 10. **[IF MEASURE IS NOT “LTO”]** My old **[MEASURE]** did not work / was broken
 11. **[IF MEASURE IS NOT “LTO”]** Preferred the look or style over than my old **[MEASURE]**
 12. Another reason – what was it? **[SPECIFY]**
 98. I’m not sure
- C2. Before you purchased your **[MEASURE]** from the Online Marketplace, where else did you consider purchasing this item? **[RANDOMIZE ITEMS 1-4]**
1. Another online retailer
 2. An in-person retailer
 3. I looked but couldn’t find it anywhere else
 4. I only looked for this item on the Online Marketplace
 5. A different source – which one? **[SPECIFY]**
- C3. **[IF C2=1,2,3]** What’s the primary reason you decided to purchase from the Online Marketplace? **[RANDOMIZE ITEMS 1-6]**
1. Focus on Energy discount
 2. Best price
 3. Most convenient
 4. To get a model/feature I couldn’t find elsewhere

5. Products recommended by Focus on Energy
6. To support Focus on Energy
7. Another reason – what was it? **[SPECIFY]**

C4. Please rate your agreement with the following statements about the Online Marketplace on a scale from 1 to 5 with 1 being “Strongly disagree” and 5 being “Strongly agree.” **[A TO G - RANDOMIZE LIST] [DROP DOWN LIST SELECTION; “1 – STRONGLY DISAGREE”, “2”, “3”, “4”, “5 – STRONGLY AGREE” AND “NOT SURE”]**

- a. It was easy to find the product I was looking for
- b. It was easy to compare prices and features across similar products
- c. The website worked smoothly, without freezing, errors or glitches
- d. The checkout process was reasonably fast and easy
- e. I received my product on time
- f. The product I received was as I expected, and in good condition
- g. I was very satisfied with my overall experience with the Online Marketplace

C5. **[FOR EACH C4a -g RESPONSE < 4]** Can you tell us more about why you do not agree with the statement **“[REPEAT STATEMENT FROM C4a – g]”?** **[OPEN-END RESPONSE]**

C6. Can you tell us more about any issues you had shopping through the Online Marketplace?

1. **[RECORD RESPONSE]**
98. I did not have any issues

C7. How could Focus on Energy improve the Online Marketplace?

1. **[RECORD RESPONSE]**
98. No suggestions

D. *Advanced Power Strip Verification & Freeridership*

[ASK SECTION IF QTY_APS>0]

[ALL FORCED RESPONSE, PER INSTRUCTIONS.]

The next questions are about the advanced power strip(s) you purchased from the Online Marketplace.

D1. Our records show you purchased **[QTY_APS]** advanced power strip(s). Is that right?

1. Yes, that’s about right
2. No, that’s not right
98. I’m not sure how many I purchased **[SKIP TO L1]**

D2. **[IF D1=2]** How many advanced power strips did you purchase?

1. **[NUMERIC ONLY 0-99] [CREATE C_APS=D2 OR COPY QTY_APS TO C_APS IF NO NUMERIC RESPONSE TO D2; USE INSTEAD OF QTY_APS GOING FORWARD]**

98. I'm not sure **[SKIP TO L1]**
- D3. How many of the advanced power strips you purchased are currently being used in a **home** (including a home office)?
1. 0
 2. 1
 3. 2
 4. 3
 5. 4
98. I'm not sure **[SKIP TO L1]**
- D4. **[IF D3 < C_APS]** How many of the advanced power strips you purchased are currently being used in a **business**?
1. 0
 2. 1
 3. 2
 4. 3
 5. 4
98. I'm not sure **[SKIP TO L1]**
- D5. **[IF D3 = 2,3,4,5]** For what purpose(s) are you using your advanced power strip(s) installed in a **home**? Select all that apply.
1. Home entertainment center (TVs, cable boxes, streaming devices Apple TV or Roku, DVD players)
 2. Home office (laptops, desktop computers, computer monitors, scanners, printers, fax machines)
 3. Gaming system
 4. Other equipment – what is it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**
- D6. **[IF D4 = 2,3,4,5]** What best describes the type of business where you are using your advanced power strip(s)? Select all that apply. **[SELECT ALL THAT APPLY]**
1. Commercial
 2. Industrial
 3. Something else – please describe: **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**
- D7. **[IF D3+D4 < C_APS]** Did you install but later uninstall any advanced power strip(s) you purchased?
1. Yes
 2. No
98. I'm not sure

D8. **[IF D3+D4 < C_APS]** What is your primary reason for not using, or installing but later removing, the advanced power strip(s)? **[RANDOMIZE ITEMS 1-7]**

1. Broken/didn't work
2. Difficult/unable to set up
3. Didn't like how it looked
4. Didn't like how the attached equipment worked when hooked up to it
5. Not enough regular outlets
6. Plan to install later
7. Never planned to install
8. Another reason – what was it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

D9. **[IF D3+D4 < C_APS]** What did you do with the advanced power strip(s) *not currently* installed? **[RANDOMIZE ITEMS 1-3. MULTIPLE RESPONSE.]**

1. Stored for future use
2. Threw away/Disposed of
3. Gave away as a gift
4. Something else – what was it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

D10. How satisfied are you with the advanced power strip(s) you purchased?

1. Very satisfied **[SKIP TO D12]**
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. I'm not sure **[SKIP TO D12]**

D11. Why are you **[INSERT RESPONSE FROM D10]**? Select all that apply. **[RANDOMIZE ITEMS 1-5]**
[MULTIPLE RESPONSE]

1. Broken/doesn't work
2. Difficult/unable to set up
3. Didn't like how it looks
4. Didn't like how the attached equipment works when hooked up to it
5. Not enough regular outlets
6. Another reason – what was it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

Now we'd like to ask you about how you made your decisions to purchase advanced power strip(s).

- D12. Did you have any advanced power strips installed in your home before you heard of the Focus on Energy discounts for advanced power strips? If so, please tell us how many.
1. Yes, I had some advanced power strips in my home - How many? **[SPECIFY]**
 2. No, I did not have any advanced power strips in my home
 98. I'm not sure
- D13. If the Focus on Energy discount had not been available, would you have bought advanced power strips for your home within 12 months?
1. Yes, at the same time - How many? **[SPECIFY]**
 2. Yes, later but within the next 12 months - How many? **[SPECIFY]**
 3. No, not within 12 months
 98. I'm not sure
- D14. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the advanced power strips. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the advanced power strips. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**
1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
 2. The Focus on Energy cash-back incentive or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a store representative, dealer or contractor
 6. Previous participation in a Focus on Energy energy-efficiency offering or program

E. *Smart Thermostat Verification & Freeridership*

[ASK SECTION IF QTY_TSTAT>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

The next questions are about the smart thermostat(s) for which you received a Focus on Energy discount in 2021.

- E1. Our records show you purchased **[QTY_TSTAT]** smart thermostat(s) with a Focus on Energy discount. Is that correct?
1. Yes, that's right
 2. No, that's not right
 98. I'm not sure how many I purchased **[SKIP TO L1]**

E2. **[IF E1=2]** How many smart thermostats did you purchase?

1. _____ **[NUMERIC ONLY 0-99] [CREATE C_TSTAT=E2 OR COPY QTY_TSTAT TO C_TSTAT IF NO NUMERIC RESPONSE TO E2; USE INSTEAD OF QTY_TSTAGOING FORWARD]**

98. I'm not sure **[SKIP TO L1]**

E3. Is a smart thermostat for which you received a Focus on Energy discount *currently* installed in your home or business?

	Installed in my home	Installed in my business	Not installed	I'm not sure
Thermostat 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
[DISPLAY IF C_TSTAT >1] Thermostat 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[IF ALL RESPONSES ARE "HOME" OR "BUSINESS" SKIP TO E6]

[IF ALL RESPONSES ARE "NOT SURE" SKIP TO L1]

[IF ALL RESPONSES TO E3 = "NOT INSTALLED", SKIP TO L1]

E4. **[IF ANY RESPONSES TO E3 = "NOT INSTALLED"]** Why did you not install the thermostat(s)?

[RANDOMIZE ITEMS 1-8]

1. Difficult/unable to set up
2. Difficult to use
3. Home was less comfortable after it was installed
4. Concerned about internet security
5. Didn't like how it looked
6. Never planned to install
7. Haven't installed yet, but plan to install
8. My contractor recommended that I not use the new thermostat with my heating/cooling equipment
9. Another reason – what was it? **[SPECIFY]**
98. I'm not sure

E5. What did you do with the thermostat(s) you did not install? **[SELECT UP TO 2]**

1. Stored for future use
2. Threw away/Disposed of/Sold
3. Gave away as a gift
4. Something else – what was it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

- E6. **[IF C_ TSTAT =1 AND E3= "HOME" OR "BUSINESS"]** What equipment does your new thermostat control? Select all that apply. **[SELECT ALL THAT APPLY]**
1. Furnace
 2. Boiler
 3. Air-source heat pump
 4. Ductless heat pump
 5. Central air conditioner
 6. Other equipment – what? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- E7. **[IF E6=1 OR 2]** What fuel does the **[RESPONSE FROM E6]** controlled by your smart thermostat use?
1. Natural gas
 2. Electricity
 3. Propane/Bottled gas
 4. Wood
 5. Something else – what is it? **[SPECIFY]**
 98. I'm not sure
- E8. **[IF C_ TSTAT >1 AND E3_1= "HOME" OR "BUSINESS"]** You indicated you purchased **[C_ TSTAT]** smart thermostats. What equipment does your **first** new thermostat control? Select all that apply. **[SELECT ALL THAT APPLY]**
1. Furnace
 2. Boiler
 3. Air-source heat pump
 4. Ductless heat pump
 5. Central air conditioner
 6. Other equipment – what is it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- E9. **[IF E8=1 OR 2]** What fuel does the **[RESPONSE FROM E8]** controlled by your **first** smart thermostat use?
1. Natural gas
 2. Electricity
 3. Propane/Bottled gas
 4. Wood
 5. Something else – what is it? **[SPECIFY]**
 98. I'm not sure

E10. **[IF C_TSTAT >1 AND E3_2= "HOME" OR "BUSINESS"]** You indicated you purchased **[C_TSTAT]** smart thermostats. What equipment does your **second** new thermostat control? Select all that apply. **[SELECT ALL THAT APPLY]**

1. Furnace
2. Boiler
3. Air-source heat pump
4. Ductless heat pump
5. Central air conditioner
6. Other equipment – what is it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

E11. **[IF 0=1 OR 2]** What fuel does the **[RESPONSE FROM 0]** controlled by your **second** smart thermostat use?

1. Natural gas
2. Electricity
3. Propane/Bottled gas
4. Wood
5. Something else – what is it? **[SPECIFY]**
98. I'm not sure

E12. What kind of thermostat did you use before you purchased your new smart thermostat?
[SELECT ONE]

1. Manual (you manually adjust the temperatures)
2. Programmable (you schedule certain temperatures at specific times / days)
3. Wi-fi enabled (you are able to adjust or scheduled temperature remotely using your phone or another device)
4. Smart (the thermostat adjusts the temperature for you and you can adjust the temperature remotely)
5. Did not previously use a thermostat
98. I'm not sure **[SKIP TO 0]**

E13. **[IF E12=1-4]** Think about how often you **manually** adjust the settings on your new smart thermostat. Would you say you adjust the settings more often, less often, or about as often as you adjusted your previous thermostat?

1. More often
2. About equally as often
3. Less often
98. I'm not sure

E14. How satisfied are you with the smart thermostat(s) you purchased?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
98. I'm not sure

Now we'd like to ask you about how you made your decisions to purchase the smart thermostat(s).

E15. When did you first hear about the availability of a Focus on Energy discount for smart thermostats? Was it...

1. Before you started shopping **[SKIP TO E17]**
2. When you received your order confirmation **[ASK E16]**
3. After you purchased the smart thermostat **[ASK E16]**
4. You had not heard of Focus on Energy before this survey **[ASK E16]**
98. I'm not sure **[SKIP TO E17]**

E16. **[ASK IF E15= 2, 3, 4]** So just to be clear, you purchased your smart thermostat before you heard anything about the Focus on Energy Focus on Energy discount. Is that correct?

1. Yes, that's correct **[SKIP TO E18]**
2. No, that's not correct **[ASK E17]**
98. I'm not sure **[ASK E17]**

E17. Before you heard about the Focus on Energy discount, had you already considered purchasing a smart thermostat?

1. Yes
2. No
98. I'm not sure

E18. Without the discount from Focus on Energy, what kind of thermostat would you have purchased?

1. A smart or learning thermostat
2. A WiFi thermostat (non-learning)
3. A programmable thermostat
4. A manual thermostat
5. Would not have purchased a new thermostat
98. I'm not sure

- E19. **[ASK IF C_ TSTAT > 1]** Would you have purchased the same quantity of smart thermostats without the discount from Focus on Energy?
1. Yes, the same quantity **[ASK E20]**
 2. No, would have purchased fewer **[ASK E20]**
 3. No, would have purchased more **[ASK E20]**
 4. No, would not have purchased anything at all **[SKIP TO E21]**
 98. I'm not sure **[ASK E20]**
- E20. Thinking about timing, without the Focus on Energy discount, would you have purchased the smart thermostat ...?
1. At the same time
 2. Later, but within 12 months
 3. One to two years out
 4. More than two years out
 5. Never
 98. I'm not sure
- E21. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the smart thermostat. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the smart thermostat. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**
- [RESPONSE FROM C1 IF C1 ≠ 5, 6 OR 7]**
1. The Focus on Energy cash-back incentive or discount
 2. Recommendation from Focus on Energy Staff
 3. Information provided by Focus on Energy on energy savings opportunities
 4. Recommendation from a store representative, dealer or contractor
 5. Previous participation in a Focus on Energy energy-efficiency offering or program

F. LED Verification & Freeridership

[ASK SECTION IF QTY_LED>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

- F1. [IF MEASURE = “Bathroom Bundle” or “Efficient Kitchen Product Bundle”] Our records show the [MEASURE] you purchased from the Focus on Energy Online Marketplace included [QTY_LED] LEDs. Is that right? [IF MEASURE ≠ “Bathroom Bundle” or “Efficient Kitchen Product Bundle”] Our records show you purchased [QTY_LED] LED(s) from the Focus on Energy Online Marketplace. Is that right?
1. Yes, that’s about right
 2. No, that’s not right
 98. I’m not sure how many LEDs I purchased [SKIP TO L1]
- F2. [IF F1=2] How many LEDs did you purchase from the Focus on Energy Online Marketplace?
1. _____ [NUMERIC ONLY 0-99] [NUMERIC ONLY 0-99]
[CREATE C_LED= F2 OR COPY QTY_LED TO C_LED IF NO NUMERIC RESPONSE TO F2;
USE C_QUANTITY INSTEAD OF QTY_LED GOING FORWARD]
- F3. Of the [C_LED] LEDs you purchased from Focus on Energy, how many are *currently* installed...
1. in your home? _____ [NUMERIC ONLY 0-99]
 2. in a business outside your home? _____ [NUMERIC ONLY 0-99]
 98. I’m not sure [SKIP TO F7]
- F4. [IF C_LED > F3] Did you install some of the LEDs but later remove them?
1. Yes
 2. No
 98. I’m not sure
- F5. [IF C_LED > F3] What is your primary reason for not installing, or removing, the LEDs you purchased? [RANDOMIZE ITEMS 1-8]
1. Property owner or manager would not allow install
 2. Waiting for other bulbs to burn out
 3. Have not installed yet, but plan to install later
 4. Don’t like the way the LEDs look
 5. Don’t like the light quality from the LEDs
 6. Doesn’t work with my dimmer or 3-way switch
 7. Gave the LEDs away, or no longer have them
 8. LEDs are broken, or failed or malfunctioned
 9. Never planned to install
 10. Another reason – what was it? [SPECIFY]
 98. I’m not sure

- F6. **[IF C_LED > F3]** What did you do with the LEDs *not currently* installed? Select up to two responses. **[ALLOW UP TO 2 RESPONSES]**
1. Stored for future use
 2. Discarded/recycled
 3. Gave to someone else
 4. Something else – what was it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- F7. How satisfied are you with the LEDs you purchased?
1. Very satisfied **[SKIP TO F9]**
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. I'm not sure **[SKIP TO F9]**
- F8. Why are you **[INSERT RESPONSE FROM F7]**? Select all that apply. **[RANDOMIZE ITEMS 1-8]**
[MULTIPLE RESPONSE]
1. Burned out/broke/stopped working
 2. Didn't fit properly in fixture
 3. Difficult/unable to install
 4. Worked properly, but not bright enough
 5. Worked properly, but didn't like the light color
 6. Didn't work properly (delay coming on, flickering, etc.)
 7. Didn't work with dimmer/three-way switch
 8. Have not installed yet/never planned to install
 9. Another reason – what is it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**

The next questions are about how you made your decisions to purchase LEDs.

- F9. Did you have any LEDs installed in your home before you heard of the Focus on Energy discounts for LEDs?
1. Yes
 2. No, I did not have any LEDs in my home
 98. I'm not sure
- F10. **[ASK IF F9 = 1]** Approximately what percentage of the light sockets in your home contained LEDs?
1. **[RECORD NUMBER 0 – 100]**
 98. I'm not sure

- F11. **[ASK IF F9 = 1]** Approximately how many total light sockets are in your home?
1. **[RECORD NUMBER]**
 98. I'm not sure
- F12. **[ASK EVERYONE]** Where was the last place you purchased lightbulbs of any type, before you shopped through the Focus on Energy Marketplace?
1. Online
 2. In person at a store
- F13. **[IF F12=1]** What website or retailer did you buy bulbs from, before the Focus on Energy Marketplace? **[RANDOMIZE ITEMS 1-8]**
1. Amazon
 2. Home Depot
 3. Lowes
 4. Walmart
 5. Target
 6. Wayfair
 7. Bulbs.com
 8. 1000Bulbs.com
 9. Another retailer – which one? **[SPECIFY]**
 98. I'm not sure
- F14. **[IF F12=2]** At what store did you last purchase light bulbs, before purchasing from the Focus on Energy Marketplace? **[RANDOMIZE ITEMS 1-6]**
1. Large home improvement store like Home Depot or Menards
 2. Discount store like Walmart or Target
 3. Grocery store
 4. Drug store like Walgreens or CVS
 5. Dollar store
 6. Thrift store like Goodwill
 7. Hardware or farm store, like Ace or Fleet Farm
 8. Somewhere else **[SPECIFY]**
 98. I'm not sure
- F15. **[ASK EVERYONE]** Thinking specifically about LEDs, if the Focus on Energy discount had not been available, would you have bought LEDs for your home or business within 12 months?
1. Yes, at the same time – How many? **[SPECIFY]**
 2. Yes, later but within the next 12 months – How many? **[SPECIFY]**
 3. No, not within 12 months
 4. No, I already had them installed in all available sockets
 99. I'm not sure

- F16. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the LEDs. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the LEDs. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**
1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
 2. The Focus on Energy cash-back incentive or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a store representative, dealer or contractor
 6. Previous participation in a Focus on Energy energy-efficiency offering or program

G. Showerhead Verification & Freeridership

[ASK SECTION IF QTY_SHWR>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

- G1. **[IF MEASURE = ""Bathroom Bundle" or "Efficient Kitchen Product Bundle"]** Our records show that the **[MEASURE]** you purchased included **[QTY_SHWR]** showerhead(s). Is that right? **[IF MEASURE ≠ ""Bathroom Bundle" or "Efficient Kitchen Product Bundle"]** Our records show you purchased **[QTY_SHWR]** showerhead(s). Is that right?
1. Yes, that's about right
 2. No, that's not right
 98. I'm not sure how many I purchased **[SKIP TO L1]**
- G2. **[IF G1=2]** How many showerheads did you purchase?
1. _____ **[NUMERIC ONLY 0-99] [CREATE C_SHWR=G2 OR COPY QTY_SHWR TO C_SHWR IF NO NUMERIC RESPONSE TO G2; USE INSTEAD OF QTY_SHWR GOING FORWARD]**
 98. I'm not sure **[SKIP TO L1]**
- G3. How many of the showerhead(s) are *currently* installed in your home?
1. _____ **[NUMERIC ONLY 0-99]**
 98. I'm not sure **[SKIP TO G7]**
- G4. **[IF C_SHWR > G3]** Did you install some of the showerhead(s) but later remove them?
1. Yes
 2. No
 98. I'm not sure

- G5. **[IF C_SHWR > G3]** What is your primary reason for not installing, or removing, the showerhead(s) you purchased? **[RANDOMIZE ITEMS 1-6]**
1. Property owner or manager would not allow install
 2. Have not installed yet, but plan to install later
 3. Don't like the way the showerhead(s) look
 4. Don't like the water flow from the showerhead(s)
 5. Did not fit / unable to install in my shower
 6. Showerhead(s) are broken, or failed or malfunctioned
 7. Never planned to install
 8. Another reason – what was it? **[SPECIFY]**
 98. I'm not sure
- G6. **[IF C_SHWR) > G3]** What did you do with the showerhead(s) *not currently* installed? Select up to two responses. **[ALLOW UP TO 2 RESPONSES]**
1. Stored for future use
 2. Discarded/recycled
 3. Gave to someone else
 4. Something else – what was it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- G7. How satisfied are you with the showerhead(s) you purchased?
1. Very satisfied **[SKIP TO G9]**
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. I'm not sure **[SKIP TO G9]**
- G8. Why are you **[INSERT RESPONSE FROM G7]**? Select all that apply. **[RANDOMIZE ITEMS 1-6]**
[MULTIPLE RESPONSE]
1. Broke/stopped working properly
 2. Didn't fit properly in shower
 3. Difficult/unable to install
 4. Don't like the way the showerhead(s) look
 5. Worked properly, but didn't like the water flow
 6. Have not installed yet/never planned to install
 7. Another reason – what is it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**

Now we'd like to ask you about how you made your decisions to purchase efficient showerheads.

- G9. Did you have any efficient showerheads installed in your home before you heard of the Focus on Energy discounts for efficient showerheads? If so, please tell us how many.
1. Yes, I had efficient showerheads in my home - How many? **[SPECIFY]**
 2. No, I did not have any efficient showerheads in my home
98. I'm not sure
- G10. If the Focus on Energy discount had not been available, would you have bought efficient showerheads for your home within 12 months?
1. Yes, at the same time - How many? **[SPECIFY]**
 2. Yes, later but within the next 12 months - How many? **[SPECIFY]**
 3. No, not within 12 months
 4. No, I already had them installed in all available showers
98. I'm not sure
- G11. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the efficient showerheads. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the efficient showerheads. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**
1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
 2. The Focus on Energy cash-back incentive or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a store representative, dealer or contractor
 6. Previous participation in a Focus on Energy energy-efficiency offering or program

H. *Faucet Aerator Verification & Freeridership*

[ASK SECTION IF QTY_AER>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

- H1. **[IF MEASURE = "Bathroom Bundle" or "Efficient Kitchen Product Bundle"]** Our records show the **[MEASURE]** you purchased included **[QTY_AER]** faucet aerator(s). Is that right? **[IF MEASURE ≠ "Bathroom Bundle" or "Efficient Kitchen Product Bundle"]** Our records show you purchased **[QTY_AER]** faucet aerator(s). Is that right?
1. Yes, that's about right
 2. No, that's not right
98. I'm not sure how many I purchased **[SKIP TO L1]**

- H2. **[IF H1=2]** How many faucet aerators did you purchase?
1. _____ **[NUMERIC ONLY 0-99] [CREATE C_AER=H2 OR COPY QTY_AER TO C_AER IF NO NUMERIC RESPONSE TO H2; USE INSTEAD OF QTY_AER GOING FORWARD]**
 98. I'm not sure **[SKIP TO L1]**
- H3. How many of the faucet aerator(s) are *currently* installed in your home?
1. _____ **[NUMERIC ONLY 0-99]**
 98. I'm not sure **[SKIP TO H7]**
- H4. **[IF C_AER > 0]** Did you install some of the faucet aerator(s) but later remove them?
1. Yes
 2. No
 98. I'm not sure
- H5. **[IF C_AER > 0]** What is your primary reason for not installing, or removing, the faucet aerator(s) you purchased? **[RANDOMIZE ITEMS 1-6]**
1. Property owner or manager would not allow install
 2. Have not installed yet, but plan to install later
 3. Don't like the way the aerator(s) look
 4. Don't like the water flow from the aerator(s)
 5. Did not fit / unable to install on my faucet(s)
 6. Aerator(s) are broken, or failed or malfunctioned
 7. Never planned to install
 8. Another reason – what was it? **[SPECIFY]**
 98. I'm not sure
- H6. **[IF C_AER > 0]** What did you do with the faucet aerator(s) *not currently* installed? Select up to two responses. **[ALLOW UP TO 2 RESPONSES]**
1. Stored for future use
 2. Discarded/recycled
 3. Gave to someone else
 4. Something else – what was it? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- H7. How satisfied are you with the faucet aerator(s) you purchased?
1. Very satisfied **[SKIP TO H9]**
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. I'm not sure **[SKIP TO H9]**

H8. Why are you **[INSERT RESPONSE FROM H7]**? Select all that apply. **[RANDOMIZE ITEMS 1-6]**
[MULTIPLE RESPONSE]

1. Broke/stopped working properly
2. Didn't fit properly on faucet(s)
3. Difficult/unable to install
4. Don't like the way the aerator(s) look
5. Worked properly, but didn't like the water flow
6. Have not installed yet/never planned to install
7. Another reason – what is it? **[SPECIFY]**
98. I'm not sure **[EXCLUSIVE]**

Now we'd like to ask you about how you made your decisions to purchase efficient faucet aerators.

H9. Did you have any efficient faucet aerators installed in your home before you heard of the Focus on Energy discounts for efficient faucet aerators? If so, please tell us how many.

1. Yes, I had efficient faucet aerators in my home - How many? **[SPECIFY]**
2. No, I did not have any efficient faucet aerators in my home
98. I'm not sure

H10. If the Focus on Energy discount had not been available, would you have bought efficient faucet aerators for your home within 12 months?

1. Yes, at the same time - How many? **[SPECIFY]**
2. Yes, later but within the next 12 months - How many? **[SPECIFY]**
3. No, not within 12 months
4. No, I already had them installed in all available faucets
99. I'm not sure

H11. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the efficient faucet aerators. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the efficient faucet aerators. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**

1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
2. The Focus on Energy cash-back incentive or discount
3. Recommendation from Focus on Energy Staff
4. Information provided by Focus on Energy on energy savings opportunities
5. Recommendation from a store representative, dealer or contractor
6. Previous participation in a Focus on Energy energy-efficiency offering or program

I. Pipe Wrap Verification & Freeridership

[ASK SECTION IF QTY_PW>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

Our records also show you received pipe wrap insulation in your [MEASURE]. This is a roll of one-inch-wide stripping that you wrap around your water heater's pipes.

11. Is the pipe wrap you received *currently* installed in your home?
 1. Yes [SKIP TO I4]
 2. No
 98. I'm not sure [SKIP TO I4]

12. What is your primary reason for not installing the pipe wrap you received? [RANDOMIZE]
 1. Property owner or manager would not allow install
 2. Difficult to install
 3. Wrong size
 4. Didn't like how it looked
 5. Have not installed yet/plan to install later
 6. Never planned to install—pipes already fully insulated
 7. Never planned to install—not interested in installing
 8. Another reason – what is it? [SPECIFY]
 98. I'm not sure

13. What did you do with the pipe wrap *not currently* installed?
 1. Stored for future use
 2. Threw away
 3. Gave to someone else
 4. Something else – what? [SPECIFY]
 98. I'm not sure

14. How satisfied are you with the pipe wrap you received?
 1. Very satisfied [SKIP TO J1Error! Reference source not found.]
 2. Somewhat satisfied
 3. Neither satisfied nor dissatisfied
 4. Somewhat dissatisfied
 5. Very dissatisfied
 98. I'm not sure [SKIP TO J1]

15. Why are you [I4]? **SELECT ALL THAT APPLY. [RANDOMIZE] [MULTIPLE RESPONSE]**
1. Difficult to install
 2. Wrong size
 3. Didn't like how it looked
 4. Have not installed yet/never planned to install
 5. Another reason – what is it? **[SPECIFY]**
 98. Don't know **[EXCLUSIVE]**
16. Before receiving the **[MEASURE]**, had you already installed pipe wrap in your home?
1. Yes
 2. No
 98. I'm not sure
17. If you had not received the **[MEASURE]** from Focus on Energy, would you have bought pipe wrap for your home within 12 months?
1. Yes, at the same time
 2. Yes, later but within the next 12 month
 3. No, not within 12 months
 4. I'm not sure
18. **[ASK EVERYONE]** We would like to know more about the factors that contributed to your purchase of the pipe wrap. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the pipe wrap. **[1 TO 6 - RANDOMIZE LIST]**
[DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]
1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
 2. The Focus on Energy cash-back incentive or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a store representative, dealer or contractor
 6. Previous participation in a Focus on Energy energy-efficiency offering or program

J. Hot Water Temperature Card Verification & Freeridership

[ASK SECTION IF QTY_HWTC>0]

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

Your **[MEASURE]** should have included a hot water temperature card that indicates if there is an opportunity to turn down your water heater temperature to save energy.

- J1. Did you use the card to test your water temperature?
1. Yes
 2. No, but I plan to use it later
 3. No, and I don't plan to use it
 98. I'm not sure
- J2. **[IF J1 = YES]** Did you reduce the temperature of your water heater as a result of using the card?
1. Yes
 2. No
 98. I'm not sure
- J3. **[IF J2= YES]** If you had not received the **[MEASURE]** from Focus on Energy, would you have reduced the temperature of in your water heater within 12 months?
1. Yes, at the same time
 2. Yes, later but within the next 12 months
 3. No, not within 12 months
 4. I'm not sure
- J4. **[IF J2= YES]** We would like to know more about the factors that contributed to reducing the temperature on your hot water heater as a result of using the card. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to reducing the temperature on your hot water heater. **[1 TO 6 - RANDOMIZE LIST] [DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT"]**
1. **[RESPONSE FROM C1 IF C1≠ 5, 6 OR 7]**
 2. The Focus on Energy cash-back incentive or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a store representative, dealer or contractor
 6. Previous participation in a Focus on Energy energy-efficiency offering or program

K. Spillover

[FORCED RESPONSES ACCORDING TO PROGRAMMING INSTRUCTIONS]

Now we would like to learn about any energy-saving improvements you may have made since purchasing the **[MEASURE]** from Focus on Energy's Online Marketplace.

- K1. Since purchasing the **[MEASURE]** discounted by Focus on Energy, have you made any other energy savings improvements or high-efficiency equipment purchases for your home that you did NOT receive for free or a cash-back incentive from Focus on Energy or another organization?
1. Yes
 2. No **[SKIP TO NEXT SECTION]**
 98. I'm not sure **[SKIP TO SECTION NEXT SECTION]**
- K2. What were the products that you installed without receiving for free or getting a cash-back incentive?
1. Gas boiler **[HOW MANY DID YOU INSTALL?]**
 2. Gas furnace **[HOW MANY DID YOU INSTALL?]**
 3. Gas tankless water heater **[HOW MANY DID YOU INSTALL?]**
 4. Gas storage water heater **[HOW MANY DID YOU INSTALL?]**
 5. Electric tankless water heater **[HOW MANY DID YOU INSTALL?]**
 6. Electric storage water heater **[HOW MANY DID YOU INSTALL?]**
 7. Insulation; attic **[HOW MANY SQUARE FEET?]**
 8. Insulation; floor **[HOW MANY SQUARE FEET?]**
 9. Insulation; ceiling **[HOW MANY SQUARE FEET?]**
 10. Insulation; other **[SPECIFY]** **[HOW MANY SQUARE FEET?]**
 11. Air sealing **[HOW MANY LINEAR FEET?]**
 12. Duct sealing **[HOW MANY LINEAR FEET?]**
 13. Low-E Storm windows **[HOW MANY SQUARE FEET?]**
 14. ENERGY STAR windows **[HOW MANY SQUARE FEET?]**
 15. ENERGY STAR air purifier **[HOW MANY DID YOU INSTALL?]**
 16. ENERGY STAR dehumidifier **[HOW MANY DID YOU INSTALL?]**
 17. ENERGY STAR clothes washer **[HOW MANY DID YOU INSTALL?]**
 18. ENERGY STAR dishwasher **[HOW MANY DID YOU INSTALL?]**
 19. ENERGY STAR pool pump **[HOW MANY DID YOU INSTALL?]**
 20. ENERGY STAR room air conditioner **[HOW MANY DID YOU INSTALL?]**
 21. ENERGY STAR refrigerator **[HOW MANY DID YOU INSTALL?]**
 22. ENERGY STAR freezer **[HOW MANY DID YOU INSTALL?]**
 23. Smart thermostat **[HOW MANY DID YOU INSTALL?]**
 24. Heat pump water heater **[HOW MANY DID YOU INSTALL?]**
 25. Central air conditioner **[HOW MANY DID YOU INSTALL?]**
 26. Air source heat pump **[HOW MANY DID YOU INSTALL?]**
 27. Ductless heat pump **[HOW MANY DID YOU INSTALL?]**

- 28. Ground source heat pump
- 29. Heat pump; other **[SPECIFY] [HOW MANY DID YOU INSTALL?]**
- 30. Advanced power strip **[HOW MANY DID YOU INSTALL?]**
- 31. Other **[SPECIFY] [HOW MANY DID YOU INSTALL?]**
- 98. I'm not sure **[SKIP TO SECTION NEXT SECTION]**

K3. **[REPEAT FOR EACH ITEM MENTIONED IN K2]** How important was your experience with the Focus on Energy **[MEASURE]** offering in your decision to install **[INSERT EACH ONE SELECTED IN K2]**. Was it ...?

- 1. **[DROP DOWN LIST OR RADIO BUTTON SELECTION; "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT", "I'M NOT SURE"]**

K4. **[REPEAT FOR EACH ITEM MENTIONED IN K2]** In what year was the **[INSERT EACH ONE SELECTED IN K2]** purchased and installed?

- 1. **[RECORD NUMERIC YEAR: "2021","2020","2019"..., 99 FOR I'M NOT SURE]**

[ASK K5 FOR EACH ONE SELECTED IN K2 EXCEPT 3 (gas tankless water heater) , 4 (gas storage water heater), 5 (electric tankless water heater), 6 (electric storage water heater), 13 (Low-E Storm windows), 14 (ENERGY STAR windows), 15 (ENERGY STAR air purifier), 16 (ENERGY STAR dehumidifier), 17 (ENERGY STAR clothes washer), 18 (ENERGY STAR dishwasher), 19 (ENERGY STAR pool pump), 20 (ENERGY STAR room air conditioner), 21 (ENERGY STAR refrigerator), 22 (ENERGY STAR freezer), 25 (Central air conditioner), 30 (advanced power strip) OR 31 (other).]

K5. Why didn't you apply for and receive a Focus on Energy rebate for **[INSERT EACH ONE SELECTED IN K2]**?

- 1. Did not know rebate was available
- 2. Product did not qualify
- 3. Other **[SPECIFY]**
- 98. I'm not sure

L. *Demographics and Household Characteristics*

The last few questions are for statistical purposes only.

L1. * What type of fuel does your **water heater** use?

- 1. Natural gas
- 2. Electricity
- 3. Propane/Bottled gas
- 4. Wood
- 5. Something else – what is it? **[SPECIFY]**
- 98. I'm not sure

- L2. * What is the main type of fuel you use to **heat your home**?
1. Natural Gas
 2. Oil
 3. Propane
 4. Electricity
 5. Wood
 6. Something else – what is it? **[SPECIFY]**
 98. I'm not sure
- L3. * What connected devices that help save energy do you have installed in your home? **[MULTIPLE RESPONSE]**
1. None **[EXCLUSIVE]**
 2. Smart thermostats
 3. Smart plugs
 4. Smart switches
 5. Smart LED bulbs
 6. Motion sensors
 7. Light sensors
 8. Temperature sensors
 9. Door/windows closure sensors
 10. Other device(s) – what are they? **[SPECIFY]**
 98. I'm not sure **[EXCLUSIVE]**
- L4. * What type of home do you live in?
1. Mobile/manufactured home
 2. Single-family home, detached house
 3. Attached house townhouse, row house, or duplex
 4. Multifamily apartment or condo building with 4 or more units
 5. Co-op/retirement community
 6. Something else – what is it? **[SPECIFY]**
 98. I'm not sure
- L5. * Do you or members of your household own or rent this home?
1. Own
 2. Rent
 3. Another situation – please describe: **[SPECIFY]**
 98. I'm not sure

- L6. * What is the highest level of school that you have completed?
1. Less than 9th grade
 2. 9th to 12th grade; no diploma
 3. High school graduate [includes GED]
 4. Some college, no degree
 5. Associate's degree
 6. Bachelor's degree
 7. Graduate or professional degree
 99. Prefer not to answer

Closing

- L7. * Do you have any other comments about your experience with Focus on Energy that you would like to share?
[RECORD RESPONSE: _____]
- L8. * On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with a program manager, who may contact you regarding your experience?
1. Yes
 2. No
 98. I'm not sure
- L9. Finally, we would like to confirm where to send your prize if you are selected as a \$100 gift card winner. Please enter a name and mailing address below. The gift card winners will be selected and notified within two weeks of the survey closing.
1. Record recipient name and mailing address below: **[RECORD RESPONSE: _____]**
 2. I do not wish to be included in the drawing

Thank you. We appreciate your help with this survey. Have a nice day.

[IF L9=1] You will be added into the drawing for a \$100 gift card.

To learn about additional opportunities to save energy and money in your home, please visit focusonenergy.com.

Wisconsin Focus on Energy Renewable Energy Offering CY 2021 Participant Survey

This survey is designed for residential and commercial customers who received an incentive for purchasing and installing a solar photovoltaic system (solar PV) through the Focus on Energy Renewable Energy Offering.

Target Quotas:

Suboffering	Sum of Participants through June 2021	Target Completes
Renewable Rewards - Business	78	As many as possible
Renewable Rewards - Residential	910	70

Interviewer instructions are in green.

Programming instructions are in red.

Answers that should not be read aloud are in parentheses “()”

A. Introduction

Hello, my name is _____ from _____. I'm calling on behalf of **Focus on Energy**. May I please speak to [CONTACT NAME]?

I am following up on your [household's/company's] participation in Focus on Energy's Renewable Energy Offering, where you received a rebate for installing a solar PV system.

- A1. Are you the person that is most familiar with your participation in that program?
1. (Yes)
 2. (No)
 88. (REFUSED) [THANK AND TERMINATE]
 99. (DON'T KNOW) [ASK TO SPEAK WITH SOMEONE WHO KNOWS AND BEGIN AGAIN]
- A2. [ASK IF A1 = 2 OR 99] May I please speak with that person? [IF NOT AVAILABLE, ATTEMPT TO SCHEDULE A CALL BACK]
1. (Yes)
 2. (No) [THANK AND TERMINATE]
 88. (REFUSED) [THANK AND TERMINATE]
 99. (DON'T KNOW) [if a call back is not scheduled then thank and terminate]
- A3. Great, Focus on Energy would like to make this offering as effective as possible. Would you be willing to participate in a survey to help Focus on Energy improve the Renewable Energy Offering? Survey participants will be entered in a drawing to win a \$100 Visa gift card and all of your answers will be kept confidential.
1. (Yes)
 2. (No) [THANK AND TERMINATE]
 88. (REFUSED) [THANK AND TERMINATE]
 99. (DON'T KNOW)

[If customer is wary of the survey, reassure them that you are not selling anything. If necessary, offer the following contact: MITCH HORRIE (608- 267-3206) as the person to contact with any questions about the validity of the research.]

[TERMINATION SCRIPT: “Those are all the questions we have for you. Thank you very much for your time.”]

[NOTE TO INTERVIEWER: If the respondent says that they have already been contacted by the program via an email/online survey or a postcard survey, the following response should be provided: “Focus on Energy follows up with each participant to ensure that it has met its high customer service standards through a brief online or postcard questionnaire. The survey that I am calling about now explores additional questions to help improve the program’s offerings.”]

B. Awareness and Motivation

- B1. Before we begin, can you confirm that you installed a solar PV system through Focus on Energy’s Renewable Energy Offering?
1. (Yes, I installed a solar PV system)
 2. (No, I did not install a solar PV system) [THANK AND TERMINATE]
 99. (Don’t Know) [THANK AND TERMINATE]
- B2. * What factor was the most important motivation for you to purchase the new solar PV system?
1. (Save energy/don’t waste energy/be more energy efficient)
 2. (This is a smart investment with a good payback)
 3. (Reduce energy costs/lower bill)
 4. (Good for the environment)
 5. (Recommended by a friend/relative)
 6. (Recommended by a retailer/dealer/contractor)
 7. (Cash / rebate / incentive payment)
 8. (Wanted the latest technology)
 9. (Advertisement [newspaper, radio, online, direct mail, email from FOE, paid search, etc.]
 10. (Utility sponsorship of the program)
 11. (Other [SPECIFY: _____])
 99. (Don’t know)
 88. (Refused)
- B3. [IF B2=6] What information did the dealer/contractor provide that motivated you to install your solar PV system?
1. (Save energy/don’t waste energy/be more energy efficient)
 2. (This is a smart investment with a good payback)
 3. (Reduce energy costs/lower bill)
 4. (Good for the environment)
 5. (Cash / rebate / incentive payment)
 6. (Focus on Energy / Utility sponsorship of the program)
 7. (Other [SPECIFY: _____])

- 99. (Don't know)
- 88. (Refused)

B4. **[IF FLAG FOR MULTIFAMILY = YES]** Did the building tenants participate in any discussions before the decision was made to install the solar PV?

- 1. (Yes)
- 2. (No)
- 99. (Don't know)

B5. **[IF FLAG FOR MULTIFAMILY = YES]** Did you anticipate using benefits from the solar PV as a selling point for your building?

- 1. (Yes)
- 2. (No)
- 99. (Don't know)

B6. **[IF B5 = 1]** What types of benefits did you perceive as a selling point? **[SELECT ALL THAT APPLY]**

- 1. (Cheaper utility bills for tenants)
- 2. (Include in marketing materials)
- 3. (Attract new tenants)
- 4. (Greener environment in the building)
- 5. (Increase rent)
- 6. (Make the building look nicer/newer)
- 7. (Other **[SPECIFY: _____]**)

B7. ***Where have you heard about the Focus on Energy's Renewable Energy Offering? [DO NOT READ LIST, RECORD ONE ANSWER]**

- 1. (Mailing - direct mail, brochure, postcard, bill insert, etc.)

B7a. Who sent the mailing?

- 1. (My utility)
- 2. (Focus on Energy)
- 3. (Another Organization)
- 4. (I'm not sure)

- 2. (An email)

B7b. Who sent the email?

- 1. (My utility)
- 2. (Focus on Energy)
- 3. (Another Organization)
- 4. (I'm not sure)

- 3. (A social media app - Facebook, Twitter, LinkedIn, etc.)

- 4. (Online ad)

- 5. (Internet search)

B7c. What were you searching for? **[SPECIFY: _____]**

- 6. (A website)

B7d. Which website?

- 1. (My utility)
- 2. (Focus on Energy)

- 3. (Another Organization)
- 4. (I'm not sure)
- 7. (Family / friend / word-of-mouth)
- 8. (Focus on Energy representative)
- 9. (Utility representative)
- 10. (Installer/Contractor/Trade Ally)
- 11. (Community or utility event)
- 12. (Through participation in another Focus on Energy offering)
- 13. (A different source: [SPECIFY: _____])
- 14. (I'm not sure)
- 88. (Refused)
- 88.

B8. *What do you think is the best way for Focus on Energy to inform the public about energy efficiency offerings? [DO NOT READ. RECORD ALL THAT APPLY. EXCLUDE RESPONSE FROM B1 UNLESS SPECIFIED IN "OTHER".]

- 1. (Promotion through other Focus on Energy offerings)
- 2. (Television)
- 3. (Radio)
- 4. (Print media, such as magazine, newspaper article or advertisement)
- 5. (Billboard/outdoor ad)
- 6. (Bill insert)
- 7. (Direct mail/brochure/postcard)
- 8. (Family/friends/word-of-mouth)
- 9. (Email from Focus on Energy)
- 10. (Focus on Energy or Utility website)
- 11. (Community or utility event)
- 12. (Other website: SPECIFY: _____)
- 13. (Social Media such as Twitter, Facebook, or Instagram)
- 14. (Other: SPECIFY _____)
- 15. (Do not want to receive information)
- 99. (Don't know)

B9. *Other than Focus on Energy's Renewable Energy Offering, are you aware of any other Focus on Energy offerings or rebates?

- 1. (Yes)
- 2. (No)
- 99. (Don't know)
- 88. (Refused)

- B10.** [ASK IF B9=1] *Which offerings or rebates are you aware of? [DO NOT READ LIST; RECORD ALL THAT APPLY]
1. (Energy Efficient Packs) [Other key words: energy-saving packs or kits, light bulb packs or kits]
 2. (Insulation and Air Sealing) [Other key words: energy assessments, home audits, weatherization, insulation, HVAC equipment, heating equipment, Home Performance with ENERGY STAR]
 3. (New Homes) [Other key words: new construction, building a new home, new build]
 4. (Retail) [Other key words: lighting, lighting discounts, LED bulbs, rebates on light bulbs, smart thermostats, pop-up retail, temporary sale at office/work, appliances]
 5. (Focus on Energy Marketplace) [Other key words: website selling efficient items, online store]
 6. (Business programs) [Other key words: audits for businesses, energy efficient lighting for businesses, rebates for businesses]
 7. (Renewable Energy Competitive Incentive Program) [Other key words: renewable energy for businesses, grants for renewable energy]
 8. (Agriculture, Schools, and Government) [Other key words: rebates for agriculture or farmers, rebates for schools, rebates for government buildings]
 9. (Design Assistance) [Other key words: energy efficient new construction, new commercial buildings]
 10. (Other [SPECIFY: _____])
 99. (Don't know)
 88. (Refused)

- B11.** [ASK IF B9=1] *Have you participated in any other Focus on Energy offerings? [DO NOT READ, BUT PROMPT IF NECESSARY; RECORD ALL THAT APPLY; IF NEEDED: SUCH AS REBATES ON LED BULBS, ENERGY STAR APPLIANCES, ENERGY-EFFICIENT UPGRADES OR HOME ENERGY AUDITS]
1. (Yes)
 2. (No)
 99. (Don't know)
 88. (Refused)

- B12.** [ASK IF B11=1] *Which offerings have you participated in? [DO NOT READ, BUT PROMPT IF NECESSARY; RECORD ALL THAT APPLY]
1. (Energy Efficient Packs) [Other key words: energy-saving packs or kits, light bulb packs or kits]
 2. (Insulation and Air Sealing) [Other key words: energy assessments, home audits, weatherization, insulation, HVAC equipment, heating equipment, Home Performance with ENERGY STAR]
 3. (New Homes) [Other key words: new construction, building a new home, new build]
 4. (Retail) [Other key words: lighting, lighting discounts, CFL bulbs, LED bulbs, rebates on light bulbs, smart thermostats, pop-up retail, temporary sale at office/work, appliances]

5. (Focus on Energy Marketplace) [Other key words: website selling efficient items, online store]
6. (Business programs) [Other key words: audits for businesses, energy efficient lighting for businesses, rebates for businesses]
7. (Renewable Energy Competitive Incentive Program) [Other key words: renewable energy for businesses, grants for renewable energy]
8. (Agriculture, Schools, and Government) [Other key words: rebates for agriculture or farmers, rebates for schools, rebates for government buildings]
9. (Design Assistance) [Other key words: energy efficient new construction, new commercial buildings]
10. (Other [SPECIFY: _____])
99. (Don't know)
88. (Refused)

C. Residential Freeridership

[ASK THIS SECTION ONLY IF PARTICIPANT IS A RESIDENTIAL CUSTOMER] Now I'd like to talk with you a bit more about your decisions to purchase the new solar PV system.

- C1. When did you first hear about the availability of the Focus on Energy Renewable Energy incentive for solar PV systems? Was it....
1. Before you contacted your contractor to purchase a system [SKIP TO C3]
 2. When the contractor provided the quote for purchase and installation [SKIP TO C3]
 3. After your contractor installed your system [ASK C2]
 4. When you received your incentive check from Focus on Energy [ASK C2]
 5. You had not heard of Focus on Energy before this call [ASK C2]
 99. (Don't know) [SKIP TO C3]
- C2. [ASK IF C1=3, 4 OR 5] So just to be clear, you purchased your solar PV system before you heard anything about the Focus on Energy incentive. Is that correct?
1. (Yes, that's correct)
 2. (No, that's not correct)
 99. (Don't know)
- C3. Before you heard about the program, had you already decided to install a solar PV system?
1. (Yes)
 2. (No)
 99. (Don't know)
- C4. What would you have done differently if the Focus on Energy Renewable Rewards Program had not been available to you? Would you have...
1. Installed a smaller, less expensive PV system
 2. Installed same size, same-cost PV system
 3. Installed a larger, more expensive PV system
 4. Not installed a PV system at all [SKIP TO C7]

99. (Don't know) [SKIP TO C7]
- C5. [ASK IF C4=1 OR 3] How much [RESPONSE FROM C4: SMALLER/LARGER] would your system have been, as a percentage? [SPECIFY]
- C6. Thinking about timing, without the Focus on Energy rebate, would you have installed the solar PV system... [READ LIST AND RECORD ONE RESPONSE]
1. At the same time
 2. Later, but within 12 months
 3. One to two years out
 4. More than two years out
 5. Never
 99. (Don't know)
- C7. [ASK EVERYONE] We would like to know more about the factors that contributed to your purchase of the solar PV system. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the solar PV system. [1 TO 6 - RANDOMIZE LIST]
1. [RESPONSE FROM B2 IF B2≠8]
 2. The Focus on Energy rebate or discount
 3. Recommendation from Focus on Energy Staff
 4. Information provided by Focus on Energy on energy savings opportunities
 5. Recommendation from a contractor or vendor
 6. Previous participation in a Focus on Energy energy-efficiency program

D. Nonresidential Freeridership

[ASK THIS SECTION ONLY IF PARTICIPANT IS A NONRESIDENTIAL CUSTOMER]

Now I'd like to talk with you a bit more about your decisions to purchase the new solar PV system[s].

- D1. First, did your organization decide to install the PV system[s] before learning about the Focus on Energy incentive?
1. (Yes) [ASK D2]
 2. (No)
 99. (DON'T KNOW)
- D2. [ASK IF D1=1] Prior to learning about the Focus on Energy incentive, was the purchase of the solar PV system[s] included in your property's capital budget?
3. (Yes) [ASK D3]
 4. (No)
 99. (DON'T KNOW)
- D3. [ASK IF D2=33] Had your property **ALREADY** ordered or purchased the PV system[s] **BEFORE** your property heard about the Focus on Energy incentive?
5. (Yes)
 6. (No)

99. (DON'T KNOW)

D4. [ASK IF B1=2] What would you have done differently if the Focus on Energy incentive had not been available to you? Would you have...

1. Installed a smaller, less expensive PV system
2. Installed same size, same-cost PV system
3. Installed a larger, more expensive PV system
4. Not installed a PV system at all [SKIP TO D7]
99. (DON'T KNOW)

D5. [ASK IF D4=1 OR 3] How much [RESPONSE FROM D4: SMALLER/LARGER] would your system have been, as a percentage? [SPECIFY]

D6. Without the incentive for the [RESPONSE FROM B1] system[s] and information or education from Focus on Energy, would you have installed the [RESPONSE FROM B1] system[s]... [READ LIST AND RECORD ONE RESPONSE]

7. Within the same year? [SKIP TO D7]
8. Within one to two years? [SKIP TO D7]
9. Within three to five years? [SKIP TO D7]
10. In more than five years? [SKIP TO D7]
99. (DON'T KNOW) [SKIP TO D7]

D7. [ASK EVERYONE] We would like to know more about the factors that contributed to your purchase of the solar PV system[s]. I'm going to read a list of possible factors that could have contributed to your decision. For each of the factors listed, please rate how important it was in your decision. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the [RESPONSE FROM B1] system[s]. [1 TO 6 - RANDOMIZE LIST]

11. [RESPONSE FROM B2 IF B2≠8]
12. The Focus on Energy program incentive or discount
13. Recommendation from Focus on Energy Staff
14. Information provided by Focus on Energy on energy savings opportunities
15. Recommendation from a contractor or vendor
16. Previous participation in a Focus on Energy program

E. Financing

These next questions are designed to provide us with an understanding of how you paid for your new solar PV system.

E1. There are a variety of incentives available for solar PV system owners. Other than the Focus on Energy Program rebate that you received, which of the following other incentives did you also receive? [Select all that apply]

1. (Federal Investment Tax Credit – an income tax credit)
2. (Renewable Energy Sales Tax Exemption – a sales tax exemption)
3. (Residential Renewable Energy Tax Credit – a property tax credit)
4. (Utility incentive [other than the Focus on Energy incentive])

- 5. (Other [Please specify: _____])
- 6. (I did not receive any incentives besides the Focus on Energy rebate)
- 99. (Don't know)

E2. **[IF CUSTOMER RECEIVED MORE THAN ONE INCENTIVE]** How important was receiving multiple incentives in your decision to install your solar PV system? Was it...

- 1. Very important
- 2. Somewhat important
- 3. Neither important nor unimportant
- 4. Somewhat unimportant
- 5. Very unimportant
- 99. (Don't know)

E3. **[IF CUSTOMER RECEIVED MORE THAN ONE INCENTIVE]** Would you have completed the same solar PV project if you had not received multiple incentives?

- 1. (Yes)
- 2. (No)
- 99. (Don't know)

E4. **[ASK ALL RESPONDENTS]** Considering all of the incentives and tax credits you received, how satisfied were you with the total dollar amount of the incentives and tax credits? Were you...

- 1. Very satisfied
- 2. Somewhat satisfied
- 3. Neither satisfied nor unsatisfied
- 4. Somewhat unsatisfied
- 5. Very unsatisfied
- 99. (Don't know)

E5. Please explain how you paid for your portion of the solar PV system costs – that is, how did you pay for remaining costs after rebates and other incentives. Did you pay for it with ... **[Select all that apply. Percentages refer to the what percent of the of the respondent's portion of the cost was paid with that payment method. Total percentages should add up to 100%.]**

- 1. (Cash or debit [What percent of your portion? _____])
- 2. (Home equity loan [What percent of your portion? _____])
- 3. (Credit card [What percent of your portion? _____])
- 4. (Another form of credit [What percent of your portion? _____])
- 5. (Other [Please specify: _____])
- 99. (Don't know)

E6. How long was the payback period for your solar PV system? (Please respond in days or months)

- 1. **[SPECIFY UNITS (DAYS, MONTHS)]**
- 99. (Don't know)

E7. How important was the length of the payback period in your decision to install your solar PV system? Was it...

- 1. Very important
- 2. Somewhat important
- 3. Neither important nor unimportant

- 4. Somewhat unimportant
- 5. Very unimportant
- 99. (Don't know)

F. System Operability

- F1. Since your solar PV system was installed, have you had any unscheduled maintenance or downtime on your solar PV system?
- 1. (Yes)
 - 2. (No) [SKIP to I1]
 - 99. (Don't know)
- F2. [ASK IF F1 = 1 AND B1 = 1, OTHERWISE SKIP TO I1] Which system component, or components, have you had issues with? (Select all that apply)
- 1. (PV modules [Please describe the issue: _____])
 - 2. (Racking [Please describe the issue: _____])
 - 3. (Roof penetrations/mounting (including leaks, if applicable) [Please describe the issue: _____])
 - 4. (Array wiring [Please describe the issue: _____])
 - 5. (Disconnects or combiners [Please describe the issue: _____])
 - 6. (Microinverter [Please describe the issue: _____])
 - 7. (DC optimizer [Please describe the issue: _____])
 - 8. (String inverter [Please describe the issue: _____])
 - 9. (Monitoring system [Please describe the issue: _____])
 - 10. (Other [Please describe the issue: _____])
 - 99. (Don't know)
- F3. [ASK IF F1 = 1] What would you estimate is the total amount of time your solar PV system was partially, or fully, inoperable since its installation? (Please respond in hours, days, or months)
- 1. [SPECIFY UNITS (HOURS, DAYS, MONTHS)]
 - 99. (Don't know)
- F4. [ASK IF F1 = 1] Is your system currently operating?
- 1. (Yes)
 - 2. (No)
 - 99. (Don't know)

G. Residential Spillover

[ASK THIS SECTION ONLY IF PARTICIPANT IS A RESIDENTIAL CUSTOMER] Now we would like to learn about any energy-saving improvements you may have made since installing the solar PV and receiving a cash-back incentive from Focus on Energy.

- G1. Since installing the PV system and receiving a cash-back incentive from Focus on Energy, have you installed any other energy-efficient products in your home or business that you did NOT receive a Focus on Energy rebate for? By energy-efficient products, we mean appliances such as ENERGY

STAR clothes washers, high efficiency water heaters, insulation, windows, or ENERGY STAR lighting such as LED light bulbs.

1. (Yes)
2. (No) [SKIP TO Section I]
99. (Don't know) [SKIP TO Section I]

G2. What were the products that you installed without getting a cash-back incentive?

1. (Gas boiler [HOW MANY DID YOU INSTALL?])
2. (Gas furnace [HOW MANY DID YOU INSTALL?])
3. (Gas tankless water heater [HOW MANY DID YOU INSTALL?])
4. (Gas storage water heater [HOW MANY DID YOU INSTALL?])
5. (Electric tankless water heater [HOW MANY DID YOU INSTALL?])
6. (Electric storage water heater [HOW MANY DID YOU INSTALL?])
7. (Insulation; attic [HOW MANY SQUARE FEET?])
8. (Insulation; floor [HOW MANY SQUARE FEET?])
9. (Insulation; ceiling [HOW MANY SQUARE FEET?])
10. (Air sealing [HOW MANY LINEAR FEET?])
11. (Duct sealing [HOW MANY LINEAR FEET?])
12. (Low-E Storm windows [HOW MANY SQUARE FEET?])
13. (ENERGY STAR windows [HOW MANY SQUARE FEET?])
14. (ENERGY STAR air purifier [HOW MANY DID YOU INSTALL?])
15. (ENERGY STAR dehumidifier [HOW MANY DID YOU INSTALL?])
16. (ENERGY STAR clothes washer [HOW MANY DID YOU INSTALL?])
17. (ENERGY STAR dishwasher [HOW MANY DID YOU INSTALL?])
18. (ENERGY STAR pool pump [HOW MANY DID YOU INSTALL?])
19. (ENERGY STAR room air conditioner [HOW MANY DID YOU INSTALL?])
20. (ENERGY STAR refrigerator [HOW MANY DID YOU INSTALL?])
21. (ENERGY STAR freezer [HOW MANY DID YOU INSTALL?])
22. (Smart thermostat [HOW MANY DID YOU INSTALL?])
23. (Heat pump water heater [HOW MANY DID YOU INSTALL?])
24. (Central air conditioner [HOW MANY DID YOU INSTALL?])
25. (Air source heat pump [HOW MANY DID YOU INSTALL?])
26. (Ductless heat pump [HOW MANY DID YOU INSTALL?])
27. (Ground source heat pump [HOW MANY DID YOU INSTALL?])
28. (Smart power strip [HOW MANY DID YOU INSTALL?])
29. (Other equipment, please specify the items and quantity below: [TEXT ENTRY])
99. (Don't know [SKIP TO SECTION I])

G3. [REPEAT FOR EACH ITEM MENTIONED IN G2] Please tell me how important your experience with the Focus on Energy Renewables Offering was in your decision to install the [INSERT EACH ONE SELECTED IN G2]. Use a scale from 1 to 5, with 1 meaning the factor was "not at all important" and 5 meaning the factor was "very important" in your decision to purchase the [RESPONSE FROM G2] system?

[RECORD "1 – NOT AT ALL IMPORTANT", "2", "3", "4", "5 – VERY IMPORTANT", "DON'T KNOW"]

G4. [REPEAT FOR EACH ITEM MENTIONED IN G2] In what year was the [INSERT ITEM FROM G2] purchased and installed?

[RECORD NUMERIC YEAR: "2021", "2020", "2019" ..., 99 FOR DON'T KNOW]

[ASK G5 FOR EACH ONE SELECTED IN G2 EXCEPT 3 (gas tankless water heater) , 4 (gas storage water heater), 5 (electric tankless water heater), 6 (electric storage water heater), 12 (Low-E Storm windows), 13 (ENERGY STAR windows), 14 (ENERGY STAR air purifier), 15 (ENERGY STAR dehumidifier), 16 (ENERGY STAR clothes washer), 17 (ENERGY STAR dishwasher), 18 (ENERGY STAR pool pump), 19 (ENERGY STAR room air conditioner), 20 (ENERGY STAR refrigerator), 21 (ENERGY STAR freezer), 24 (Central air conditioner), 28 (smart power strip) OR 29 (other equipment).]

- G5. Why didn't you apply for and receive a Focus on Energy rebate for the [INSERT EACH ONE SELECTED IN G2]?
1. (Did not know rebate was available)
 2. (Product did not qualify)
 3. (Other [SPECIFY: _____])
 99. (Don't know)

H. Nonresidential Spillover

[ASK THIS SECTION ONLY IF PARTICIPANT IS A NONRESIDENTIAL CUSTOMER]

- H1. Since installing the [RESPONSE FROM B1] systems[s] has your company installed any other energy-efficient products in your facility that you did **NOT** receive a Focus on Energy incentive for?
1. (Yes) [ASK H2]
 2. (No) [SKIP TO NEXT SECTION]
 99. (DON'T KNOW) [SKIP TO NEXT SECTION]
 88. (REFUSED) [SKIP TO NEXT SECTION]
- H2. What were the other energy-efficient products that you installed without getting an incentive? [DO NOT READ LIST; MARK ALL THAT APPLY; 99=DON'T KNOW, 88=REFUSED, -96=N/A] [IF THE CUSTOMER SAYS THEY BOUGHT SOMETHING BUT HAVE NOT INSTALLED IT, THE EQUIPMENT HAS TO BE INSTALLED AND OPERATING FOR US TO COUNT IT TOWARDS SPILLOVER.]
1. (LEDs bulbs or lamps)
 2. (Efficient lighting controls (occupancy sensors, daylighting, timers))
 3. (High efficiency motors)
 4. (Air source heat pumps)
 5. (Ground source heat pumps)
 6. (Central AC)
 7. (VSD (variable speed drive))
 8. (Water heating equipment)
 9. (Boiler)
 10. (Compressed air equipment)
 11. (Gas furnaces)
 12. (Exit signs)
 13. (Refrigeration equipment (refrigerators, freezers))
 14. (HVAC system controls)
 15. (Operational improvements) [SPECIFY: _____]
 16. (Other) [SPECIFY: _____]
 99. (DON'T KNOW) [SKIP TO NEXT SECTION]

88. (REFUSED) [SKIP TO NEXT SECTION]

H3. [REPEAT FOR EACH ITEM MENTIONED IN H2] How many [INSERT ITEM FROM H2] did you install?
[RECORD NUMBER _____, 99 FOR DON'T KNOW, AND 96 FOR N/A]]

H4. [REPEAT FOR EACH ITEM MENTIONED IN H2] In what year was the [INSERT ITEM FROM H2]
purchased and installed?
[RECORD NUMERIC YEAR: "2021", "2020", "2019" ..., 99 FOR DON'T KNOW, AND 96 FOR N/A]]

[ASK H2.11-H2.14 IF H2=1]

H2.11 In what location was it installed (Wall, Ceiling, Outdoor)? [RECORD/ALLOW MULTIPLE
RESPONSES, 99=DON'T KNOW]

H2.12 [REPEAT FOR EACH ITEM MENTIONED IN H2.11] What is the wattage of the [H2.11
RESPONSE] LED lighting? [RECORD RESPONSE, 99=DON'T KNOW]

H2.13 [REPEAT FOR EACH ITEM MENTIONED IN H2.11] How many [H2.11 RESPONSE] LED Lighting
did you install? [RECORD RESPONSE, 99=DON'T KNOW]

H2.14 [REPEAT FOR EACH ITEM MENTIONED IN H2.11] What type of [H2.11 RESPONSE] lighting
equipment was removed or replaced? [RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.21-H2.22 IF H2=2]

H2.21 How many lamps are controlled by the efficient lighting controls installed? [RECORD
RESPONSE, 99=DON'T KNOW]

H2.22 What is the average wattage of the lamps controlled by the lighting controls installed?
[RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.31-H2.33 IF H2=3]

H2.31 How is the high efficiency motor controlled? (Always on, manual start/stop, VSD / ECM /
VFD, Other)? [RECORD RESPONSE, 99=DON'T KNOW]

H2.32 On what equipment was the high efficiency motor installed on? [RECORD RESPONSE,
99=DON'T KNOW]

H2.23 What is the horsepower of the high efficiency motor? [RECORD RESPONSE, 99=DON'T
KNOW]

[ASK H2.41-H2.43 IF H2=4,5]

[ASK H2.42-H2.43 IF H2=6]

H2.41 [REPEAT FOR EACH ITEM MENTIONED IN H2] What is the heating efficiency rating (HSPF) of
the [INSERT ITEM FROM H2]? [RECORD NUMERIC RESPONSE: 0.1 TO 20.0 "HSPF RATING",
99=DON'T KNOW]

H2.42 [REPEAT FOR EACH ITEM MENTIONED IN H2] What is the cooling efficiency rating (SEER/EER)
of the [INSERT ITEM FROM H2]? [RECORD NUMERIC RESPONSE: 0.1 TO 30.0 "SEER/EER RATING",
99=DON'T KNOW]

H2.43 [REPEAT FOR EACH ITEM MENTIONED IN H2] What is the output capacity in BTUs of the
equipment? [RECORD NUMERIC RESPONSE: 0 TO 1,000,000 "BTUS", 99=DON'T KNOW]

[ASK H2.51-H2.52 IF H2=7]

H2.51 On what type of equipment was the VSD (variable speed drive) or motor installed? [RECORD
RESPONSE, 99=DON'T KNOW]

H2.52 What is the horsepower of the motor? [RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.61-H2.64 IF H2=8] [ASK H2.62-H2.64 IF H2=9]

H2.61 What type of water heating equipment was purchased and installed? [READ LIST]

1. Water heater with storage
2. Tankless water heater
3. Heat pump water heater
4. Condensing water heater
5. Boiler
98. (Don't know)

H2.62 What fuel type is used? [RECORD RESPONSE, 99=DON'T KNOW]

H2.63 What is the thermal efficiency rating of the water heating equipment? [RECORD NUMERIC RESPONSE: 0.00 TO 0.99 "EFFICIENCY FACTOR (EF)", 99=DON'T KNOW]

H2.64 [ASK IF H2.61 NOT EQUAL TO "TANKLESS WATER HEATER" OR H2=9] What is the capacity of the equipment in gallons? [[RECORD NUMERIC RESPONSE: 0 TO 10,000 "CAPACITY IN GALLONS", 99=DON'T KNOW]

[ASK H2.71-H2.72 IF H2=10]

H2.71 What is the compressed air equipment being used for? [RECORD RESPONSE, 99=DON'T KNOW]

1. Cycling refrigerated air dryers
2. Dewpoint demand controls for desiccant dryers
3. No air-loss condensate drains
4. Pressure/flow controllers
5. Compressed air mist eliminators
6. Air-entraining nozzles
7. Heat recovery
8. Other: [RECORD RESPONSE]

H2.72 What is the horsepower of the compressor motor? [RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.81-H2.82 IF H2=11]

H2.81 What is the annual fuel utilization efficiency (AFUE) rating of the gas furnace? [RECORD RESPONSE, 99=DON'T KNOW]

H2.82 What is the output capacity in BTUs of the gas furnace? [RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.91 IF H2=13]

H2.91 What type of refrigeration equipment was purchased and installed? [RECORD RESPONSE, 99=DON'T KNOW]

[ASK H2.101 IF H2=14]

H2101 What type of HVAC system controls was purchased and installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

1. Smart thermostat
2. Building automation system
3. Other: [RECORD RESPONSE]

H2.92 What type of heating and cooling equipment are controlled by the HVAC system controls? [RECORD RESPONSE, 99=DON'T KNOW]

- H5. [REPEAT FOR EACH ITEM MENTIONED IN H2] Please tell me how important your experience with the Focus on Energy Renewables Offering was in your decision to install [ANSWER FROM H2]. Use a scale from 1 to 5, with 1 meaning the factor was “not at all important” and 5 meaning the factor was “very important” in your decision to purchase the [RESPONSE FROM H2] system?
[RECORD “1 – NOT AT ALL IMPORTANT”, “2”, “3”, “4”, “5 – VERY IMPORTANT”, 99 FOR “DON’T KNOW”]
- H6. Was [INSERT EACH ITEM FROM H2] installed at [SITE ADDRESS]?
1. (Yes)
 2. (No) ASK: What is the address of the location where you installed [INSERT EACH ITEM FROM H2]? [SPECIFY _____]
 99. (Don’t know)

I. Demographics and Household Information/Business Firmographics

Now I have just a few final questions.

- I1. What type of fuel does the water heater use where you installed the solar PV system?
1. (Natural gas)
 2. (Electricity [Please specify: standard electric, heat pump water heater, solar, ground-source heat pump desuperheater, other])
 3. (Propane/Bottled gas)
 4. (Wood)
 5. (Other [SPECIFY])
 99. (Don’t know)
- I2. What type of fuel do you primarily use for space heating where you installed the solar PV system?
1. (Natural Gas)
 2. (Oil)
 3. (Propane)
 4. (Electricity)
 5. (Wood)
 6. (Other [SPECIFY: _____])
 99. (Don’t know)
- I3. [IF PROGRAM NAME = RENEWABLE REWARDS – RESIDENTIAL] What type of home was the solar PV system installed at?
1. (Mobile/manufactured home)
 2. (Single-family home, detached house)
 3. (Attached house townhouse, row house, or duplex)
 4. (Multifamily apartment or condo building with 4 or more units)
 5. (Co-op/retirement community)

- 6. (Other [SPECIFY])
- 99. (Don't know)

I4. [IF PROGRAM NAME = RENEWABLE REWARDS - BUSINESS] What is the primary building use where solar PV system was installed?

- 1. (Retail)
- 2. (Office)
- 3. (Grocery)
- 4. (Restaurant)
- 5. (Public Safety (police, fire house))
- 6. (Government (non-public safety))
- 7. (Place of Worship)
- 8. (School)
- 9. (Hospital/health care)
- 10. (Agriculture)
- 11. (Warehouse)
- 12. (Factory/manufacturing)
- 13. (Vehicle repair)
- 14. (Military)
- 15. (Other [SPECIFY])
- 99. (Don't know)

I5. [IF PROGRAM NAME = RENEWABLE REWARDS – RESIDENTIAL] Do you or members of your household own or rent this home?

- 1. (Own)
- 2. (Rent)
- 3. (Other: SPECIFY: _____)
- 99. (Don't know)

I6. [IF PROGRAM NAME = RENEWABLE REWARDS – BUSINESS] Do you or members of your business own or rent the building where the solar PV system was installed?

- 1. (Own)
- 2. (Rent)
- 3. (Other: SPECIFY: _____)
- 99. (Don't know)

I7. [ASK IF I5=2 OR I6=2] How is your electric utility bill paid?

- 1. (Your utility bills you directly)
- 2. (Your maintenance fees or rent includes utility costs)
- 3. (Your bill is split evenly between units within the complex)
- 4. (Other: SPECIFY: _____)
- 99. (Don't know)

I8. [ASK IF I5=2 OR I6=2] How is your gas utility bill paid?

- 1. (Your utility bills you directly)

2. (Your maintenance fees or rent includes utility costs)
3. (Your bill is split evenly between units within the complex)
4. (Other: SPECIFY: _____)
99. (Don't know)

I9. **[IF PROGRAM NAME = RENEWABLE REWARDS – RESIDENTIAL]** What is the highest level of school that you have completed? Stop me when I get to the correct category.

1. Less than 9th grade
2. 9th to 12th grade; no diploma
3. High school graduate [includes GED]
4. Some college, no degree
5. Associate's degree
6. Bachelor's degree
7. Graduate or professional degree
88. (Prefer not to answer)

I10. **[IF PROGRAM NAME = RENEWABLE REWARDS – RESIDENTIAL]** Which of the following categories best represents your age? Stop me when I get to the correct category.

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65-74
7. 75 or older
88. (Prefer not to answer)

I11. **[IF PROGRAM NAME = RENEWABLE REWARDS – RESIDENTIAL]** Which category best describes your total household income in 2020 before taxes? Stop me when I get to the correct category.

1. Less than \$20,000
2. \$20,000 to \$49,999
3. \$50,000 to \$74,999
4. \$75,000 to \$99,999
5. \$100,000 to \$149,999
6. \$150,000 to \$199,999
7. \$200,000 or more
88. (Prefer not to answer)

Closing/Thank and Terminate Language

CLOSING SCRIPT: Those are all of the survey questions we have.

1. Do you have any other comments about your experience with Focus on Energy that you would like to share?

[RECORD RESPONSE: _____]

2. On occasion, Focus on Energy may want to contact a customer to learn more about their participation experience. May we share your responses with a program manager, who may contact you regarding your experience?

1. Yes
2. No

-98. I'm not sure

3. Are you interested in entering the drawing for a \$100 gift card?

1. Yes, please confirm the name and address where the card can be mailed if you're selected [record contact name and mailing address]

[ADDRESS LINE 1]

[ADDRESS LINE 2]

[CITY]

[ZIP]

[STATE]

2. No, not interested

Focus on Energy appreciates your input. Thank you for your time.

Focus on Energy CY 2021 Interview Guide: Trade Ally Solutions – Renewable Energy

Respondent name:

Respondent phone:

Interview date:

Interviewer initials:

Table 1. Research Objectives Map

Research Questions	Interview Guide Questions
Recruitment and Satisfaction	
What about the offering motivates trade allies to participate?	Q8
Are there barriers to trade ally participation?	Q9
Are trade allies satisfied with offering design and implementation? (Training, communication, etc.)	Q10-Q20
How else can the offering help trade allies' businesses? (For example, could marketing be improved? Assisting in workforce development needs?)	Q20, Q27, Q32
Marketing	
What are the most effective channels and messages for promoting the offering?	Q21, Q25-Q26
Do trade allies reference the offering in business advertising?	Q22-Q23
Customer and Trade Ally Experience	
What insights do trade allies have on what barriers exist to customer participation?	Q28-Q29
Do trade allies have workforce development needs to ensure they can adequately deliver the offering to their customers?	Q30-Q32
How satisfied are trade allies and what opportunities for improvement exist?	Q33-Q35

Introduction

Thank you for making the time to speak with me. We are interviewing several trade allies who participate in the Renewable Energy offering to get a deeper understanding of how your business is interacting with the offering. We hope to get your perspective on things that are working well and any areas where you have experienced challenges. This information will inform potential changes to the offering in the coming year, so we encourage you to be as direct as possible and offer any suggestions you have for improvement.

While we do not expect to ask you anything sensitive, our policy is to never use your name or the name of your company in our report.

Finally, we do appreciate that you are very busy so we are offering a \$100 Visa gift card as a thank you for sharing your time and feedback today. At the end we will confirm the address of where to send the \$100 gift card.

Do you have any questions before we begin?

A. Role and Responsibilities

First, I'd like to know about your specific role and responsibilities with regard to the Focus on Energy Renewable Energy offering.

Q1. Please tell me your role within your company and your relation to the offering.

Q2. In what part of the state do you generally work?

Q3. What percentage of work do you do in rural versus urban areas?

Q4. Our records show that you have completed [_____] projects in 2021. Does that sound about right?

Q5. [IF PARTICIPATED LAST YEAR] According to our records, your completed number of projects in 2021 is [HIGHER THAN/LOWER THAN/SIMILAR TO] the number of projects you completed at this time in 2020. Does that sound correct?

1. [IF Q5 DIFFERENT THAN PREVIOUS YEAR] What do you think accounts for the difference in project volume between this year and last year? [PROBE: UPTAKE/DOWNTAKE REASONS. I.E. ECONOMY, MARKETING, LABOR SHORTAGE, OFFERING INFLUENCE]

Q6. Across all of the work your company does, roughly what percentage goes through the Focus on Energy offering? [IF NEEDED: JUST A BALLPARK OR ESTIMATION IS FINE]

Q7. Overall, how would you describe the offering's impact on your business?

B. Recruitment and Support

Next, I have a few questions about your recruitment to become a Renewable Energy offering trade ally and your interaction with the offering.

Q8. When did your company become a participating contractor for the Renewable Energy offering? [IF LESS THAN 3 YEARS]:

1. How did your company first learn about the Renewable Energy offering?
2. What motivated your company to participate and become a registered trade ally?

Q9. Thinking through the past couple of years, have you encountered any issues participating in the offering? [PROBE: PAPERWORK, CLARITY OR TIMING OF COMMUNICATIONS, ETC.]

[IF ISSUES ARE STATED] Were these issues satisfactorily resolved?

Q10. Have you attended any of the technical trainings or trade ally forums held by Focus on Energy?

1. Yes
2. No [SKIP TO Q13]
98. Don't know

Q11. [IF Q10 = 1] What was the most recent Focus on Energy training or forum that you attended? [PROBE: NAME OF EVENT, DATE OF EVENT, VIRTUAL OR IN PERSON]

- Q12. How useful did you find the [TRAINING/TRADE ALLY FORUM]? Is there anything Focus on Energy can do to make their [TRAINING/TRADE ALLY FORUM] more beneficial/useful?
- Q13. Is there any additional training or support that you would like the offering to provide? If so, what?
- Q14. Last year Focus on Energy changed the solar PV incentive. Have you noticed a difference in customer sales/demand with the incentive changes? [PROBE: RECENT INCREASE IN INCENTIVES FOR SPECIAL SECTORS (NONPROFITS, SCHOOLS, GOVT, AND TRIBES)]
- Q15. How well does the current incentive from Focus on Energy motivate customers to participate?
- Q16. If the offering were to increase incentives next year, do you believe that your business would be able to install more systems?
- Q17. Next, I'm going to read off a list of actions Focus on Energy is taking with regard to the offering. For each, I'd like you to tell me if you think Focus on Energy is doing an **excellent, good, fair, or poor** job. How would you say Focus on Energy is doing when it comes to ...
1. Reaching out to you and keeping you informed about operational and incentive changes
 2. Making paperwork easy to submit
 3. Providing you with tools and resources to effectively market offerings to your customers
 4. Providing educational opportunities or training resources
 5. Providing the right amount of support so you can confidently sell and install solar PV systems
- Q18. [ASK FOR ANY "FAIR" OR "POOR" RESPONSES TO Q21] What could Focus on Energy do to improve [SUMMARY OF RESPONSE TO Q21]?
- Q19. What kind of business or customer interaction changes have you made due to COVID-19? [IF YES] Do you feel that Focus on Energy has provided adequate support to your company during these adjustments?
- Q20. Across all aspects of the Renewable Energy offering, in what areas is Focus on Energy doing well or exceeding your expectations? What would you say is the one most important thing for Focus on Energy to improve? [PROBE: OUTREACH/EDUCATION, PROVIDING RESOURCES, PROVIDING TRAININGS, EFFECTIVE FEEDBACK SYSTEM OR Q13 "POOR" RESPONSES]

C. Marketing and Promotion

Now let's move on to the subject of marketing and promotion.

- Q21. How does your company typically acquire new customers? [PROBE: ONLINE MARKETING, SOCIAL MEDIA CONTRACTOR RANKING WEBSITES, TV/RADIO, PRINT ADS, WOM, OFFERING WEBSITE/MARKETING, EMAILS, COUPONS, DIRECT MAIL]
- Q22. How often does your company promote the Focus on Energy incentive to customers?
1. All the time
 2. Frequently
 3. Sometimes

- 4. Seldom
- 5. Never

- Q23. [IF Q22 = 3 or 4 or 5] Why don't you promote the incentive to customers more often?
- Q24. Do you promote any other incentives, grants, or tax credits to customers alongside the Focus on Energy incentive? [IF YES] Does combining these with Focus on Energy incentives seem to make a difference in customer's motivations to participate?
- Q25. Do you use any of the marketing materials provided by Focus on Energy? If so, which materials do you use? Do you have any suggestions for improvements to individual marketing pieces supplied by the offering? [PROBE: DO YOU THINK THE MATERIALS USE APPROPRIATE MESSAGING? IF NEEDED: MATERIALS INCLUDE INFORMATIONAL HANDOUTS, LINKS TO ONLINE RESOURCES, ONLINE EDUCATIONAL VIDEOS, ETC.]
- Q26. What marketing messages do you think work best to promote the Renewable Energy offering? [PROBE: STACKING OF INCENTIVES, FOCUS ON ENERGY ENDORSEMENT, FINANCIAL SAVINGS, ENVIRONMENTAL STEWARDSHIP, ENERGY INDEPENDENCE]
- Q27. How, if at all, could Focus on Energy better support your marketing efforts or help grow your business?

D. Barriers and Program Delivery

I'd like to ask you about customer barriers and program delivery aspects of the offering.

- Q28. Beyond cost, what other factors make customers hesitate to install solar PV systems? [PROBE: PERMITTING, UTILITY INTERCONNECTION PROCESSES]
1. Do you notice these barriers in certain demographic groups? (regional, age, etc.) Does the offering help address these obstacles?
- Q29. Has COVID-19 affected customer demand or created new barriers?
- Q30. Do you feel your company is in a good position to handle customer demand? (staffing, training, access to materials, etc.)
1. [IF NOT] What type of workforce or resources do you need?
 2. Do you feel this workforce gap is due to COVID?
- Q31. [IF LOOKING FOR ADDITIONAL WORKFORCE DEVELOPMENT] Do you typically look for employees who are already trained on solar PV systems or are you open to training new hires?
1. [IF LOOK FOR TRAINED EMPLOYEES] How easily do you typically find trained employees?
- Q32. Thinking about new and existing employees, do you have any suggestions for how Focus on Energy could assist in your workforce development needs?

E. Wrap-up

- Q33. On a Zero to 10-point scale where 0 means “not all satisfied” and 10 means “extremely satisfied,” how satisfied are you with Focus on Energy overall? [RESPONSE CHOICES RANGING FROM 0-10, PLUS “DON’T KNOW”]
- Q34. What is one thing Focus on Energy can improve to increase your satisfaction with the offering?
- Q35. Is there anything we have not discussed about the offering that you would like to share?
- Q36. The last question I have is to confirm where we can send your \$100 Visa gift card. Could you please provide the address where we should mail it?

Those are all the questions we have for you today. Focus on Energy appreciates your time and your feedback. Have a good day.

Focus on Energy CY 2021 Interview Guide
Participating Home Builders
Residential New Construction Offering
October-November 2021

Respondent name/Company: _____

Respondent phone: _____

Interview date: _____ Interviewer initials: _____

Table with 2 columns: Research Questions, Interview Guide Questions. Rows include questions about builder profiles, experience, market evolution, and marketing.

Thank you for taking the time to speak with me. My company, Cadmus, was hired by the Public Service Commission of Wisconsin to evaluate the Focus on Energy Residential New Construction Offering. This offering provides financial incentives to builders who construct homes that are more energy efficient than the requirements set by the current Wisconsin Uniform Dwelling Code.

We would like to understand the perspective of builders who participated in the Residential New Construction Offering this year and want to gather their input on the Wisconsin housing market.

Do you have 30 minutes to discuss your experience with the offering and the new construction market? We're offering a \$100 gift card for your time. All your responses will be kept strictly confidential and will not be attributed to you or your company in our reporting.

A. Screening and Introduction

A1. We see that your company certified (a) home(s) through the Focus on Energy Residential New Construction this year. Do you remember certifying that/those homes?

IF YES: CONTINUE OR ASK TO SCHEDULE A CONVENIENT TIME TO TALK.

[text]

B. General Builder Information

To start, I have a few questions about all of the homes that your company builds in Wisconsin – both certified and non-certified homes.

- B1. About how many homes will you have built in Wisconsin by the end of 2021?
 [text]
- a) How does this number compare to your expectations at the start of the year? [If actual number different from expectation, ask why]
 [text]
 - b) Of these homes, how many do you expect will be certified through the Focus on Energy Residential New Construction Offering? [If needed: a quantity or percent is fine]
 [text]
 - c) [Ask if builder builds both certified and non-certified homes] Why do you build both certified and non-certified homes? [Probe if necessary: construction techniques, insulation levels, mechanicals, size, etc.]
 [text]
 - d) [Ask if builder builds both certified and non-certified homes] How do your certified and non-certified homes differ?
 [text]
 - e) How does the number of homes you built this year, and percent of homes certified, compare to last year? [If there is a difference, ask why.]
 [text]
 - f) Does your company focus on any particular type of home in Wisconsin? That is, do you build custom homes, spec homes, both types, or multifamily homes? If you build multiple types, what percentage of your total homes fall into each category?
 [text]
- B2. Have there been any changes to how you build homes over the last three years? [Probe for specific equipment uses or construction techniques.]
 [text]
- a) [Ask if builder has made changes in practices] Why have you made these changes?
 [text]
 - b) What role do subcontractors play in your decisions to change your building practices? [Probe for anything specific to energy efficiency, such as insulation types, equipment efficiencies, etc.]
 [text]
 - c) [Ask if builder has made no changes in practices] What factors or influences would drive you to make changes in the way that you build homes? [Probe for market demand, Focus on Energy / BPC influence, contractor advice.]
 [text]

- d) What is your most trusted source of information regarding making changes to your building practices, particularly as they relate to energy efficiency?
[text]

B3. What type of subcontractors do you use to build your homes?
[text]

- a) Do these subcontractors require special skills, certifications, or trainings to build energy efficient homes? If so, what are these?
[text]

- b) Have you experienced any challenges gaining access to qualified contractors in the last three years? What about more recently?
[text]

C. Program Participation

C1. Why do you participate in the Focus on Energy Residential New Construction Offering?
[text]

- a) When did you begin participating in the offering?
[text]

- b) What you are the top three benefits you experience from certifying a home?
[text]

C2. What are the top three challenges that you experience in certifying a home?
[text]

C3. What effect has the New Construction Offering had on how your company builds homes in Wisconsin? Please focus on specific equipment or building practices.
[text]

C4. What have been your company's interactions with the offering's building performance consultants (also known as BPCs)?
[text]

- a) What value do BPCs bring to your building practices, beyond certifying the home?
[text]

- b) Please rate your interactions with the BPCs, where 1 is unsatisfactory and 5 highly satisfactory, for the following categories:

- (a) Communication [text]
- (b) Timeliness [text]
- (c) Guidance/Information about energy efficiency [text]
- (d) Trustworthiness [text]

C5. Have you participated in any of the technical trainings offered by Focus on Energy?

[text]

- a) [If yes] How many did you attend? Do you recall the topics of the training?
[text]
- b) What did you find most helpful about the training sessions?
[text]
- c) What effect did the training(s) have on how you build homes?
[text]
- d) Would you like to see more Focus on Energy trainings? [If yes, are there specific topics you'd like to see in those trainings?]
[text]
- e) What is the most convenient time of the year for you to attend trainings?
[text]

C6. This year the offering has introduced several changes to its incentive structure, including the introduction of additional incentives for heat pump water heaters, continuous exterior insulation, highly efficient furnaces, as well as a per-energy-unit reduced incentive structure. In 2021 Focus on Energy has also made some of the previous mandatory requirements, such as whole-home ventilation, "recommended best practices."

How have these programmatic changes affected your participation in the offering? [Probe if necessary: number of homes certified, overall construction techniques, types of subcontractors they work with]

[text]

- a) Have you experienced any challenges associated with the new offering design? [Probe for specific equipment availability]
[text]
- b) Would you say your satisfaction with the offering has changed due to these changes?
[text]

C7. Do you participate in any other building certification programs, such as ENERGY STAR, Wisconsin Green Built, or Passive House? If so, what are the benefits of that program?

[text]

D. General Market Questions

D1. Over the past three years, what changes have you seen in the Wisconsin new homes market that have affected how you build homes? [Probe if necessary: effects of COVID, effects of labor shortage]

[aging population of contractors] or tariffs, consumer knowledge and preferences, changes in building practices.]

[text]

a) How have these trends affected your ability to build efficient homes?

[text]

b) Why do you think these trends have emerged?

[text]

c) Where do you think these market trends are heading?

[text]

D2. What effect do you think the Residential New Construction Offering has on Wisconsin's residential new construction market at large?

[text]

D3. How do you think the offering affects nonparticipating builders? [Probe: use of building consultants, contractors gaining knowledge of efficient construction practices, greater home-buyer demand for efficient homes.]

[text]

D4. [Ask if not addressed above.] If in the last three years, have you faced any issues in gaining access to labor or supplies to build energy efficient homes? [Probe: Heat pump water heaters]

[text]

E. Marketing

E1. How do you market your homes?

[text]

a) Do you market your homes as energy-efficient? If so, how?

[Probe: oper]

[text]

b) How frequently do your customers ask about energy efficient features or operating cost, [Ask if builder constructs custom homes] particularly when constructing custom homes?

[text]

c) How does the timing of the home sale (such as selling a home before construction begins, or selling a home after it has been constructed) affect the energy efficiency of the home (such as equipment selection, insulation levels, etc)?

[text]

F. Closing

- F1. Is there anything that Focus on Energy could improve about the offering? [Probe: communication with builders, marketing to the public, processes, requirements]
[text]
- F2. What else can Focus on Energy do to impact the Wisconsin residential building market?
[text]
- F3. Is there anything else you think would be valuable for us to know to understand energy efficient building practices in Wisconsin?
[text]

Thank you for taking the time to talk to me today, I appreciate that your time is limited. Your input is valuable and will be very helpful in our study.

Collect/confirm contact data to mail the gift card.

Wisconsin Focus on Energy Commercial Real Estate Owner/Manager In-Depth Interview Guide

July 22, 2021

The evaluation team will interview commercial real estate (CRE) decision makers. The purpose of the interviews is to:

1. Identify any changes or challenges that their business and their tenant's businesses have undergone due to COVID-19
2. Assess their awareness of and interest in energy efficiency improvements at their properties, including energy management systems, retro-commissioning, and gaining knowledge through building operator certification courses
3. Determine what opportunities exist for Focus on Energy to support these businesses in making improvements.

Instrument Information

Table 1: Overview of Data Collection Activity

Item	This Instrument
Instrument Type	In-Depth Interview
Estimated Time to Complete	30 minutes
Population Description	Commercial real estate decision makers (energy managers, facility managers, property managers or owners)
Sampling Strata Definitions	TBD
Population Size	TBD
Sample Frame Size	TBD
Call List Size; Email list size	TBD
Completion Goal(s)	20-30
Call List Source and Date	Focus on Energy; TBD
Type of Sampling	TBD
Contact Sought	Property manager or owner decision makers
Incentive	\$100 gift card (mail)
Fielding Firm	Nexant through October 5. Cadmus resumed called October 14

Email Invitation

TBD

Table 2: Research Objectives and Associated Questions

Research Objective	Associated Questions
Respondent role, Property description	Q1-Q5
Strategic Planning	0-Q8
Interest in and Knowledge of Energy Efficiency Upgrades and Program Offers	Q9-Q14
Interest in and Knowledge of Retrocommissioning and MEEA Certification	Q15-Q17.
COVID-19 Impacts and Planning	Q18-Q26
Wrap up	Q27-Q28

Instrument

Introduction

S1. Hello, my name is [NAME] and I am calling on behalf of Focus on Energy, Wisconsin's statewide energy efficiency and renewable resource program. Focus on Energy hired my firm, Cadmus, to learn about the commercial real estate market and any challenges your organization has recently faced with building occupancy.

[IF NO CONTACT NAME] May I please speak with the person who is most involved with making decisions about equipment upgrades and energy use at your company's commercial leased space?

[IF CONTACT NAME PROVIDED]: May I please speak with [CONTACT NAME]?

- a) (Yes)
- b) (Yes, call transferred) [START OVER WITH NEW RESPONDENT]
- c) (No, not available) [SCHEDULE CALLBACK]
- d) (DON'T KNOW) [ASK TO SPEAK WITH SOMEONE WHO WOULD KNOW AND START AGAIN]

The purpose of my call today is to discuss your experience in the commercial real estate sector specific to three main topics: your awareness of and interest in energy efficiency, challenges you and/or your tenants have undergone due to COVID-19, and opportunities for Focus on Energy to support your business in making energy improvements. This interview is designed to take no more than 30 minutes. **As compensation for your time, we are offering a \$100 Visa gift card.**

Is now a good time to talk? Your comments are confidential and will be anonymous for reporting purposes, meaning your name and your company name will not be tied to any of your responses. If I ask you about topics that you are unfamiliar with, please feel free to let me know and we will move on.

Roles, Responsibilities, Property description

Q1. First, I'd like to ask you about your company and your role at your company. Are you the property owner, property manager, maintenance or facilities supervisor, or some combination of these?

Answer here.

Q2. In square feet, about how much **commercial** space does your company manage In Wisconsin?
If “don’t know,” prompt to ask, how many properties with commercial space does your company own or manage in Wisconsin? If respondent does not manage any commercial leased space, thank them for their time and terminate call.

Answer here.

Q3. Where in Wisconsin are these properties, generally?

Answer here.

Q4. About what percentage are Class A, B, and C, respectively, would you say? How much is mixed-use?

****LC/EO Reference****

Class A- These buildings represent the newest and highest quality building.

Class B - This is the next notch down. Class B buildings are generally a little older, but still have good quality management and tenants.

Class C -The lowest classification of office building and space is Class C. Older architecture and in need of upgrades

Mixed Use – buildings with a mix of multifamily and commercial leased space

Answer here.

Q5. Who typically manages energy use at your properties (managers, energy managers, maintenance staff, building operators, other, don’t know)?

****LC/EO Reference**** Objective of this question really is to understand how large their properties are, how they operate and measure their commitment to energy efficiency. Typically bigger organizations have an Energy Manager and those that don’t have one may be smaller and less dedicated to energy efficiency.

Answer here.

Strategic Planning

Next, I’m going to ask you a few questions about strategic planning. As we go through these questions, please let us know if there are any changes that have recently been made due to COVID-19.

Q6. How are your properties evaluated for potential improvement needs? [Probe: What is the process for assessing facility needs? Is there a typical schedule or timeframe where a building is specifically evaluated for property improvements? Have any changes have been made to this approach due to COVID-19?]

Answer here.

Q7. If the need for a building improvement is identified in one facility, are similar facilities simultaneously looked at for similar needs? [Probe: why or why not? Are similar improvement projects funded all at once, or on a facility-by-facility basis? Have there been any changes to this approach due to COVID-19?]

Answer here.

Q8. What factors are considered when deciding whether or not to make major building improvements? [Probe for specifics: budget, time, emergency needs, new leases, energy-efficiency, tenant, etc. Have any changes been made recently to these factors due to COVID-19?] Are there any factors that are typically given priority? When are these decisions typically made?

Answer here.

Interest in and Knowledge of Focus on Energy, Energy Efficiency Upgrades and Program Offers

Q9. Now I’m going to ask a few questions regarding energy efficiency. Before our call today, were you familiar with Focus on Energy? Would you say you were... [READ LIST]

- 1 a. very familiar, somewhat familiar, or not familiar at all?
- 2 b. [If familiar] Have you participated in any Focus on Energy offerings, if so which ones?

Answer here.

Q10. How important would you say energy efficiency is to your company? (*Very important, somewhat important, not too important, not at all important*) And why would you say that?

Answer here.

Q11. How important would you say energy efficiency is to your tenants (*Very important, somewhat important, not too important, not at all important*)? Why would you say that?

Answer here.

Q12. What type of lease agreements do you generally have with your tenants (full-service gross, modified gross, triple net)? (Prompt: *Are tenants responsible for any/all utility costs? How are costs determined [based on actual use, prorated by size]?*)

****LC/EO Reference**** *this is to understand who pays for what in the building such as the utility bills and other items.*

Full service gross: *is owner to tenant the rent covers all property operating expenses. The landlord pays these expenses using the tenant's rent to offset the costs.*

Modified gross lease: *(or modified net lease) allows a broader range of negotiations when it comes to operating expenses. The base rent will then be subjected to the terms agreed upon by both parties like the gross lease.*

Triple Net: *The triple net lease encompasses property taxes, insurance, and common area maintenance, with the tenant paying for some or all of the cost of these three things on top of their base rent*

Answer here.

Q13. How does this lease structure affect the level of importance you or tenants place on energy efficiency?

Answer here.

Q14. Who is typically responsible for the cost of improvements? Does your company provide an allowance?

****LC/EO Reference**** *this speaks to if they provide tenants with an amount of money to do improvements.*

Answer here.

Interest in and Knowledge of Retrocommissioning and MEEA Certification

Q15. In this next section I will ask you a few questions about specific technology and offerings.

Retrocommissioning is the process of improving the performance and energy efficiency of equipment, building systems, and operations as a whole. Through retrocommissioning, you can manage energy use more effectively, improve indoor air quality and building occupant comfort, and identify maintenance needs before they become costly repairs.

****LC/EO Reference**** *The Focus on Energy RCx offering identifies lower cost measures involving adjustments, recalibrations, and process changes to provide quick energy saving paybacks.*

Are you aware that Focus on Energy offers retrocommissioning incentives?

Answer here.

- 1 **(IF YES)** Has your company looked into or participated in this offer?
- 2 **(ASK ALL)** What is your immediate reaction to this type of offer?
- 3 **(ASK ALL)** What would encourage you to look into this offer?

Q16. Energy management systems (EMS) go beyond the functionality of a building management system (BMS) by collecting data about your energy use and provide building owners and managers a way to analyze their building's usage patterns and identify ways to save energy.

Do you have any energy management systems in place for your properties? Why or why not?

Answer here.

- 1 a. [if Q16=NO] What is your immediate reaction to this type of software?
- 2 b. [if Q16=NO] What would encourage you to look into an energy management system?

Q17. The Midwest Energy Efficiency Alliance (MEEA) offers Building Operator Certification (BOC) courses to help property owners and managers explore and manage their energy use. The BOC is a nationally recognized training and certification program that focuses on energy efficient building operations and preventative maintenance procedures. The level one training consists of 16 half-day sessions, and graduates earn a training certificate and qualify for the certification exam. Focus on Energy provides scholarships to cover the full cost of completing the training.

****LC/EO Reference**** *Building Operator Certification (BOC) is a nationally recognized training and certification program that focuses on energy efficient building operations and preventative maintenance procedures. The Level I training includes lectures, discussion, small group exercises, in-class test and project assignments and will require about 74 hours of time. Cost associated with it.*

Are you aware of this offer? (if yes) Have you or staff at your company completed this training?

Answer here.

- 1 a. [if Q17=NO] What is your immediate reaction to this offer?
- 2 b. [if Q17=NO] What would encourage you to look into this offer?
- 3 c. [if Q17=NO] Might this be something you might encourage or require of your employees in the future?

If the respondent would like to look into any of the above three offerings further, refer them to www.focusonenergy.com/business

COVID-19 Impacts and Planning

Next, let's talk about how your company has changed since early 2020 - any challenges you or your commercial tenants have faced due to COVID-19.

Q18. Have you experienced turnover, vacancies, or other changes in tenancy you would attribute to the COVID-19 pandemic? **Answer here.**

- 1 **[If Yes]:**
- 2 a. Would you describe what you've experienced?
- 3 b. How have things shifted from 2020 to 2021?
- 4 c. Have these affects varied by property type, such as multifamily, office, warehouse/industrial?
- 5 d. What share of your buildings would you say have been affected?

Q19. Have you changed your rent pricing for your commercial leased space? Any other property types?

- 1 **[If Yes]** Did you increase or decrease it? How much? What did you consider when you modified your pricing structure?

Answer here.

- Q20. Have any of your tenants' occupancy levels changed due to the pandemic that may have affected their energy use (e.g. fewer staff in the office due to work from home policies)? If so, what types of tenants are you seeing this in, and in what ways?
- A. Has this trend persisted into 2021?
 - B. How many of your tenants are still employing flexible work-from-home policies? (Just an estimate).
 - C. Do you anticipate that your tenants will return to pre-COVID occupancy rates?

Answer here.

- Q21. Have you reconfigured commercial space or completed any other upgrades due to the pandemic? (For example, installed air filtration systems, modified ventilation, etc)
- a. **[IF YES]** Were any of these projects designed to be energy saving? If so, are you or your contractor anticipating Focus on Energy incentives for the project?
 - b. **[IF YES]** Were any of these projects designed to improve air quality or safety?
 - c. Were any other COVID related changes made that affected energy consumption?
 - d. **[IF YES TO ANY]** Do you plan to keep these systems or settings installed moving forward?

Answer here.

- Q22. **[If Q21 = YES]** Have vacancies made completing these upgrades easier, or otherwise affected the decision to undertake them? If so, how?

Answer here.

- Q23. Has the pandemic changed how your company plans for or considers upgrades, in terms of strategy, capital spending decision-making, property uses, etc.? If so, how?

Answer here.

- Q24. Has the pandemic affected the size of your current portfolio? If so, how?

Answer here.

- Q25. Has the pandemic caused any other changes to your business practices or that of your tenants that we have not discussed?

Answer here.

- Q26. What are your company's top priorities or areas of concern for 2021 and 2022?

Answer here.

Wrap Up

- Q27. In conclusion, I have a couple of questions on how Focus on Energy might support you. Is there anything you'd say that Focus on Energy could do to better serve you or your tenants?

Answer here.

- Q28. Thinking about everything we have discussed, what do you think is the most important thing Focus on Energy can do to encourage greater participation in its offerings for commercial real estate?

Answer here.

CLOSE and Gift Card Mailing

Thank you, that concludes my questions.

What is the best mailing address to mail the \$100 Visa gift card to?
(Record address, double check for accuracy)

You can expect to receive the gift card in the mail in approximately 7 business days.

There is four-digit code you will need to activate the gift card. For security purposes, it is best if we share the code with you separate from the card. You can write it down now and refer back to it once you receive the card. Do you have a pen to write it down? Suggest also emailing it to yourself.

Four-digit activation code: **2880**

Thank you for your valuable time participating in this study.
Enjoy the rest of your day!

**Focus on Energy Nonresidential Customer General Population/
Nonparticipants Survey: CY2021**

Researchable Topics	Item
Introduction and screening	A1 - Error! Reference source not found.
Awareness of Focus offerings	C1 - C8
Decision making and Energy Efficiency attitudes	D1 - D6
Motivations, barriers, and benefits to participation	E1- E7
Potential participation, spillover	F1 - F7
COVID-Related questions	0 - G12
Indoor Agriculture questions	Error! Reference source not found. - H5
Interest in new technologies	I1 -I5
Firmographics	J1 -0

CY2021 Objectives:

- Observe current levels of Focus on Energy awareness and compare to previous measurements
- Explore time-sensitive topics with potential bearing on Focus on Energy participation:
 - COVID impacts on business operations and energy improvement propensity
 - Business priorities for energy efficiency upgrades in 2021
 - Development efforts for indoor agriculture in anticipation of possible medical or recreational marijuana legalization
 - Large retail delivery and warehouse energy efficiency opportunities
- Identify the types and amounts of energy savings attributable to Focus on Energy in the form of nonparticipant spillover
- Identify trends in the commercial market compared to 2018 survey results and gauge market interest in specific technologies such as controls and smart thermostats

Interviewer instructions are in green.

CATI programming instructions are in red.

Items that should not be read are in parenthesis.

*Questions with asterisk indicate marketing questions

Audience: This survey is for business customers who are not currently participating in a Focus on Energy energy efficiency offering.

[Variables from sample]

[CONTACT NAME]

[CONTACT PHONE]

[COMPANY]

[ADDRESS] – *premise address from customer records*

[UTILITY]

[INDUSTRY]

Survey quotas:

Segment	General Population Target Sample (n)	% of General Population Sample	Xcel Energy Oversample Target (n)	% of Xcel Energy Oversample
Hospitality (restaurants and hotels)	30	17.6%	12	17.1%
Healthcare	30	17.6%	12	17.1%
Industrial	30	17.6%	12	17.1%
Retail	30	17.6%	12	17.1%
Agriculture (indoor)	15	8.8%	6	8.6%
Agriculture (other)	15	8.8%	6	8.6%
Other (including property management)	20	11.8%	10	14.3%
Total	170	100%	70	100%

A. Introduction

- A1. Hello, I’m [INSERT NAME], calling on behalf of Focus on Energy, Wisconsin’s statewide energy efficiency and renewable energy program. May I speak with [CONTACT NAME?] [OR IF NO CONTACT NAME] the person who makes equipment upgrade decisions for your business?
 - 1. (Yes)
 - 2. (No) [THANK AND TERMINATE]
 - 98. (Don’t know) [ASK TO SPEAK WITH CORRECT PERSON]
 - 99. (Refused) [THANK AND TERMINATE]

- A2. Focus on Energy is interested in your opinions to help improve their business incentive offerings and to better understand how to assist customers in saving money and energy. Please be assured this is not a sales call. My questions are for research purposes only. Are you the best person to talk to about this?
 - 1. (Yes)
 - 2. (No) [ASK TO SPEAK WITH CORRECT PERSON]
 - 98. (Don’t know) [ASK TO SPEAK WITH CORRECT PERSON]
 - 99. (Refused) [THANK AND TERMINATE]

- A3. We’d like to let you know that any information that you share with us today will be confidential and not attributed to any one individual or business.

B. Screeners

B4. In the past 12 months, has your company received an incentive from Focus on Energy for installing energy efficient equipment or renewable energy? By energy-efficient equipment, I mean high efficiency

heating and air conditioning, variable speed drives, high efficiency lighting; or other equipment which uses less energy than what you already have.

1. (Yes) [THANK AND TERMINATE]
2. (No)
98. (Don't know) [THANK AND TERMINATE]
99. (Refused) [THANK AND TERMINATE]

B1. We show your company's name as [COMPANY], is that correct? This information will not be connected to your responses in this survey. We are asking to confirm the accuracy of our Wisconsin businesses list, and again, this information will not be tied to your responses.

1. (Yes)
2. (No) RECORD NAME

B2. Which of the following best describes your company's business type: [READ LIST]

1. Restaurants, hotels or hospitality;
2. Healthcare;
3. Industrial or manufacturing;
4. Property management for commercial real estate or multifamily residences;
5. Retail;
6. Agriculture;
7. Or something else [SPECIFY]
99. (Refused) [THANK AND TERMINATE]

Thank and Terminate Instruction: POLITELY THANK RESPONDENT FOR THEIR AND END THE CALL.

[ASK IF B2=6]

B3. What types of agriculture does your business engage in? [READ IF NECESSARY - NO SKIPPING, SELECT ALL THAT APPLY]

1. (Outdoor crops or produce / farming)
2. (Indoor crops or produce / greenhouses) [MEETS INDOOR AGRICULTURE QUOTA]
3. (Forestry / lumber / tree farming)
4. (Dairy)
5. (Non-dairy livestock / fishery)
6. (Lawn care / landscaping)
7. (Other - Describe: [RECORD RESPONSE])

[CONFIRM THE INDUSTRY IN B2-B3 DOES NOT HAVE A FULL QUOTA BEFORE CONTINUING. IF QUOTA IS FULL, READ TERMINATE MESSAGE BELOW.]

Over-quota Thank and Terminate Script: Thank you. Our goal with this study is to speak to companies representing several industries, and we have already reached our quota for your industry so we have no further questions. Thank you very much for taking the time to speak with me today.

Thank and Terminate Script: Thank you. We are speaking with companies who have not received an incentive for installing energy efficient equipment in the last year from Focus on Energy. Thank you for speaking with me today.

Back-up information, not to be programmed:

[If “No – Not a convenient time,” ask if Respondent would like to arrange a more convenient time for us to call them back or if you can leave a message for that person.]

[IF RESPONDENT ASKS HOW LONG, SAY: “APPROXIMATELY 15 MINUTES.”]

[IF NEEDED:] This survey is for research purposes only and this is not a marketing call. This is a way for customers to provide input into the incentive offerings Focus on Energy offers for businesses. Your participation in this study is important so that Focus on Energy can include your perspectives in how their energy efficiency incentives are offered.

[IF RESPONDENT SAYS THE DECISIONS ARE HANDLED IN A CORPORATE OFFICE THEN ASK FOR NAME AND PHONE NUMBER FOR THAT PERSON]

[Only if asked for a Focus on Energy contact to verify the survey authenticity, offer Mitch Horrie at (608) 267-3206.]

c. Awareness

- C1. Before today, had you heard anything about Focus on Energy’s energy-efficiency incentive offerings for business customers that help businesses reduce their energy consumption and save money on their energy bills?
1. (Yes)
 2. (No) [SKIP TO C6]
 98. (Don’t know) [SKIP TO C6]
 99. (Refused) [SKIP TO C6]

[ASK IF C1=1]

- C2. What are the first three words that come to mind when you hear “Focus on Energy”? [OPEN END]

[ASK IF C1=1]

- C3. Which Focus on Energy incentive offerings, if any, come to mind? [DO NOT READ; RECORD ALL THAT APPLY]
1. (Lighting)
 2. (Heating or Air Conditioning)
 3. (Refrigeration)
 4. (Commercial kitchen equipment)
 5. (Motors or drives)
 6. (New building design/construction)
 7. (Building energy assessments)
 8. (Building envelope, such as insulation, doors, windows)
 9. (Renewable energy)
 10. (Other) [SPECIFY]
 11. (None)
 98. (Don’t know)
 99. (Refused)

[ASK IF C1=1]

- C4. How did you learn about these offerings? [DO NOT READ. MULTIPLE CHOICES POSSIBLE]
1. (Contacted by Focus on Energy representative)
 2. (Our organization contacted Focus on Energy directly)
 3. (Utility staff representative)
 4. (Utility communications: bill insert, customer service, email or website)
 5. (Word of mouth - family, friend, or business colleague)
 6. (Contacted by contractor or vendor)
 7. (Previously participated in program/offering/received an incentive) [Ask if they participated/received incentive in last year. IF YES, THANK AND TERMINATE]
 8. (Conference, workshop, business event)
 9. (Through professional organization or a trade association)
 10. (Trade publication)
 11. (Focus on Energy mailing)
 12. (Email from Focus on Energy)
 13. (Focus on Energy website)
 14. (Newspaper ad)
 15. (Radio ad)
 16. (TV ad)
 17. (Web search (e.g., searching on Google, Bing, or Yahoo))
 18. (Social Media (e.g., Facebook, Twitter, YouTube))
 19. (Online ads)
 20. (Other) [SPECIFY: _____]
 98. (Don't know)
 99. (Refused)

[ASK IF C1=1]

- C5. How likely is it that your business requests an incentive from a Focus on Energy offering for an energy efficiency project in the next 6 months? Would you say... [READ LIST]
1. Very likely
 2. Somewhat likely
 3. Not too likely
 4. Not at all likely
 98. (Don't know)
 99. (Refused)

[ASK IF C1=2, 98, or 99]

- C6. The Focus on Energy business offerings provide financial incentives and engineering services to businesses to help install energy efficient equipment such as heating and cooling equipment, lighting, pumps, kitchen equipment, and others. How likely is it that your business would request an incentive from a Focus on Energy offering in the next 6 months? Would you say ... [READ LIST]
1. Very likely
 2. Somewhat likely
 3. Not too likely
 4. Not at all likely
 98. (Don't know enough about the offering to answer)
 99. (Refused)

[ASK IF C5 OR C6= 1 OR 2]

C7. What type of equipment are you most likely to install or retrofit? [MULTIPLE CHOICES POSSIBLE]
[DO NOT READ].

1. (Lighting)
2. (Heating and air conditioning units)
3. (Pumps/Motors/Drives/VFDs)
4. (Refrigeration or kitchen equipment)
5. (Industrial Process equipment)
6. (Other equipment [SPECIFY])
98. (Don't know)
99. (Refused)

[ASK EVERYONE]

C8. What is the best way for Focus on Energy to let you know about their incentives for energy-efficient improvements? [DO NOT READ. RECORD UP TO THREE RESPONSES]

1. (Direct contact with Focus on Energy staff member)
2. (Direct contact with a vendor/contractor)
3. (Program sponsored conference, workshop, business event)
4. (Through professional organization or a trade association)
5. (Trade publication)
6. (Focus on Energy mailing)
7. (Email from Focus on Energy)
8. (Focus on Energy website)
9. (Newspaper ad)
10. (Radio ad)
11. (TV ad)
12. (Social Media (e.g., Facebook, Twitter, YouTube))
13. (Online ads)
14. (Other) [SPECIFY]
98. (Don't know)
99. (Refused)

D. Decision Making and Energy Efficiency Attitudes

D1. Does your business have corporate policies about energy efficiency that are considered when purchasing new equipment or making improvements?

1. (Yes)
2. (No)
98. (Don't know)

[ASK IF D1 = 1]

D2. Which of the following best describes this policy? [READ OPTIONS]

1. Your business almost always purchases energy efficient equipment as a rule
2. Your business purchases energy efficient equipment if it meets payback criteria [IF NEEDED: This refers to longer term costs over time.]

- 3. Your business purchases energy efficient equipment if it meets return on investment criteria
- 4. Your business purchases energy efficiency equipment if it fulfills goals/requirements in sustainability plan or policy
- 5. (Something else) [SPECIFY]
- 98. (Don't know)

D3. What is the role or title of the primary decision maker regarding energy efficiency equipment upgrades? [WE ARE NOT LOOKING FOR SPECIFIC NAMES, JUST TITLES]

- 1. [RECORD RESPONSE]
- 98. (Don't know)
- 99. (Refused)

D4. Next, I'm going to read a list of statements about energy efficiency. Please indicate how important these statements are to you when deciding whether to make energy efficient improvements to your facility. For each statement, please say very important, somewhat important, not too important, or not important at all. [RANDOMIZE, READ EACH OPTION and RECORD RESPONSE; RESPONSE OPTIONS very important, somewhat important, not too important, or not at all important when deciding whether to upgrade the energy efficiency of your organization]

- 1. Energy efficiency saves my organization money on its utility bills
- 2. Energy efficiency upgrades make my organization more productive
- 3. Energy efficiency creates jobs and contributes to the Wisconsin economy
- 4. Energy efficiency protects the environment by reducing greenhouse gas emissions

D5. [ASK IF AT LEAST 2 ITEMS FROM D4 ARE RATED "VERY IMPORTANT" OR "SOMEWHAT IMPORTANT"] Of the energy efficiency statements you just rated, which is the most important to you when deciding whether to make energy efficient improvements to your building or facility? [SINGLE RESPONSE]

- 1. [PIPE IN ALL "VERY IMPORTANT" AND "SOMEWHAT IMPORTANT" RESPONSE CHOICES FROM D4]
- 98. (Don't know)

D6. Who or what sources do you seek out as a trusted source of information regarding energy efficiency?

- 1. [RECORD RESPONSE]
- 98. (Don't know)
- 99. (Refused)

E. Motivation, Barriers, and Benefits to Participating

E1. I'm going to read you a list of scenarios that companies experience when purchasing new equipment or considering energy-efficient improvements like efficient lighting. Please tell me whether you agree with these statements. If it doesn't apply to you, please let me know that. The first statement is: [RANDOMIZE, READ STATEMENT; THEN JUST FOR THE FIRST STATEMENT READ THE FOLLOWING: Would you say you strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree?

[READ LIST AND RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, AND 4=STRONGLY DISAGREE; 97= NOT APPLICABLE, 99=DON'T KNOW, AND 88=REFUSED]

- a. Making upgrades at our facility is an inconvenience.
- b. Making energy efficiency upgrades to this facility is too costly.
- c. Our existing heating and cooling systems work fine, and we don't replace working equipment even if it is not energy efficient.
- d. My company leases space, so we do not want to invest in energy efficiency upgrades.
- e. Proposed capital upgrades must meet a certain return on investment and energy efficiency is not a major consideration when determining the ROI.
- f. Decisions about equipment upgrades are made at a corporate office, and we don't have much input at this facility.
- g. My company has made all the energy efficiency improvements we can without a substantial investment
- h. My company lacks available and/or knowledgeable staff who could make energy efficiency upgrades

E2. If you had to choose just one, what would you say is normally the largest challenge in implementing energy efficiency projects and upgrades at your organization? Would you say: [READ LIST; RECORD only one]

1. Cost
2. Time
3. Technical questions or technical issues, or
4. Your organization's own internal decision making or budgeting process
98. (Don't know)
99. (Refused)

E3. What would motivate your business to make more energy-efficient purchases or upgrades on current equipment? [DO NOT READ LIST; RECORD UP TO 3 RESPONSES]

1. (Lower costs of product/equipment)
2. (Information on return on investment)
3. (More information generally)
4. (Higher incentives)
5. (Incentives on different products/technologies)
6. (Other) [SPECIFY]
98. (Don't know)
99. (Refused)

[ASK IF E3=3]

E4. When you say you would like more information, what kind of information is most useful?

1. [RECORD RESPONSE]
98. (Don't know)
99. (Refused)

[ASK IF E3=5]

- E5. What kind of equipment or technologies would you like to see incentives for from Focus on Energy?
1. [RECORD RESPONSE]
 98. (Don't know)
 99. (Refused)

[ASK IF C1=1]

- E6. What are the reasons you have not participated in a Focus on Energy offering in the past year? [DO NOT READ LIST; MULTIPLE CHOICES POSSIBLE]
1. (Don't know enough about offerings)
 2. (Don't understand what equipment/measures are available)
 3. (Don't have resources for initial investment)
 4. (Don't have enough time to participate)
 5. (Not sure how much savings there will be)
 6. (Don't see any benefits)
 7. (Have participated more than a year ago and do not see a need)
 8. (Have not made any upgrades in the past year)
 9. (Other) [SPECIFY]
 98. (Don't know)
 99. (Refused)

[DO NOT ASK IF E6=98 or 99]

- E7. What could Focus on Energy do to help your business be more likely to participate in one of their offerings?
1. [RECORD ANSWER]
 98. (Don't know)
 99. (Refused)

F. Spillover

The next questions are about energy-efficient improvements you may have made in the past twelve months.

[ASK EVERYONE]

- F1. Did you install any energy-efficient equipment in the past year without getting an incentive? By energy-efficient equipment, I mean products like high efficiency heating and cooling equipment, variable speed drives, or LED lighting?
1. (Yes)
 2. (No) [SKIP TO NEXT SECTION]
 98. (Don't know) [SKIP TO NEXT SECTION]
 99. (Refused) [SKIP TO NEXT SECTION]

[ASK IF F1=1]

- F2. What were the energy-efficient products that you installed without getting an incentive? [DO NOT READ LIST; MARK ALL THAT APPLY] [If the customer says they bought something but have not installed it, the equipment has to be installed and operating for us to count it towards spillover]
1. (LEDs)
 2. (lighting controls; occupancy sensors, daylighting, timers)
 3. (High efficiency motors)

4. (Air source heat pumps)
5. (Ground source heat pumps)
6. (Central AC)
7. (VSD (variable speed drives or motors))
8. (Water heating equipment)
9. (Boiler)
10. (Compressed air equipment)
11. (Gas furnaces)
12. (LED exit signs)
13. (Refrigeration equipment; refrigerators, freezers)
14. (HVAC system controls)
15. (Operational Improvements) [SPECIFY:_____]
16. (Other) [SPECIFY:_____]
98. (DON'T KNOW) [EXCLUSIVE RESPONSE; SKIP TO NEXT SECTION]
99. (REFUSED) [SKIP TO NEXT SECTION]

[ASK F2.11-F2.13 IF F2=1]

F2.11 [REPEAT FOR EACH ITEM MENTIONED IN F2] In what location were the LEDs installed (Wall/Ceiling/Outdoor)? [RECORD/ALLOW MULTIPLE RESPONSES, 99=DON'T KNOW, 88=REFUSED]

F2.12 [REPEAT FOR EACH ITEM MENTIONED IN F2.11] What is the wattage of the new [F2.11 RESPONSE] LED lighting installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.13 [REPEAT FOR EACH ITEM MENTIONED IN F2.11] How many new [F2.11 RESPONSE] LED lighting did you install? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.14 [REPEAT FOR EACH ITEM MENTIONED IN F2.11] What type of [F2.11 RESPONSE] lighting equipment was removed or replaced? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.21- F2.22 IF F2=2]

F2.21 How many lamps are controlled by the efficient lighting controls installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.22 What is the average wattage of the lamps controlled by the lighting controls installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.31-F2.33 IF F2=3]

F2.31 How is the high efficiency motor controlled? (Always on, manual start/stop, VSD / ECM / VFD, Other)? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.33 On what equipment was the high efficiency motor installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.33 What is the horsepower of the high efficiency motor? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.41 IF F2=4, 5] [ASK F2.42 IF F2=4, 5, 6] [ASK F2.43 IF F2=4, 5, 6]

F2.41 [REPEAT FOR EACH ITEM MENTIONED IN F2] What is the heating efficiency rating (HSPF) of the [INSERT ITEM FROM F2]? [RECORD NUMERIC RESPONSE: 0.1 TO 20.0 “HSPF RATING”, 99=DON’T KNOW, 88=REFUSED]

F2.42 [REPEAT FOR EACH ITEM MENTIONED IN F2] What is the cooling efficiency rating (SEER/EER) of the [INSERT ITEM FROM F2]? [RECORD NUMERIC RESPONSE: 0.1 TO 30.0 “SEER/EER RATING”, 99=DON’T KNOW, 88=REFUSED]

F2.43 [REPEAT FOR EACH ITEM MENTIONED IN F2] What is the output capacity in BTUs of the [INSERT ITEM FROM F2]? [RECORD NUMERIC RESPONSE: 0 TO 1,000,000 “BTUS”, 99=DON’T KNOW, 88=REFUSED]

[ASK F2.51-F2.52 IF F2=7]

F2.51 On what type of equipment was the VSD (variable speed drive) or motor installed? [RECORD RESPONSE, 99=DON’T KNOW, 88=REFUSED]

F2.52 What is the horsepower of the motor? [RECORD RESPONSE, 99=DON’T KNOW, 88=REFUSED]

[ASK F2.61-F2.64 IF F2=8]

F2.61 What type of water heating equipment was purchased and installed? [READ LIST]

1. Water heater with storage
2. Tankless water heater
3. Heat pump water heater
4. Condensing water heater
5. Boiler
98. (Don’t know)
99. (Refused)

F2.62 What fuel type is used? [RECORD RESPONSE, 99=DON’T KNOW, 88=REFUSED]

F2.63 What is the thermal efficiency rating of the water heating equipment? [RECORD NUMERIC RESPONSE: 0.00 TO 0.99 “EFFICIENCY FACTOR (EF)”, 99=DON’T KNOW, 88=REFUSED]

F2.64 [ASK IF F2.61 NOT EQUAL TO “TANKLESS WATER HEATER”] What is the capacity of the equipment in gallons? [RECORD NUMERIC RESPONSE: 0 TO 10,000 “CAPACITY IN GALLONS”, 99=DON’T KNOW, 88=REFUSED]

[ASK F2.71-F2.72 IF F2=10]

F2.71 What is the compressed air equipment being used for? [RECORD RESPONSE, 99=DON’T KNOW, 88=REFUSED]

1. Cycling refrigerated air dryers
2. Dewpoint demand controls for desiccant dryers
3. No air-loss condensate drains
4. Pressure/flow controllers
5. Compressed air mist eliminators
6. Air-entraining nozzles
7. Heat recovery
8. Other: [RECORD RESPONSE]

F2.72 What is the horsepower of the compressor motor? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.81-F2.82 IF F2=11]

F2.81 What is the annual fuel utilization efficiency (AFUE) rating of the gas furnace? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F2.82 What is the output capacity in BTUs of the gas furnace? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.91 IF F2=13]

F2.91 What type of refrigeration equipment was purchased and installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

[ASK F2.101-F2.102 IF F2=14]

F2.101 What type of HVAC system controls was purchased and installed? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

1. Smart thermostat
2. Building automation system
3. Other: [RECORD RESPONSE]

F2.102 What type of heating and cooling equipment are controlled by the HVAC system controls? [RECORD RESPONSE, 99=DON'T KNOW, 88=REFUSED]

F3. [REPEAT FOR EACH ITEM MENTIONED IN F2 EXCEPT DO NOT ASK FOR LEDs IF F2= 1] How many [INSERT ITEM FROM F2] did you install? [RECORD NUMBER _____, 99 FOR DON'T KNOW, 88 FOR REFUSED, AND -96 FOR N/A]]

F4. [REPEAT FOR EACH ITEM MENTIONED IN F2] In what year was the [INSERT ITEM FROM F2] purchased and installed? [RECORD NUMERIC YEAR: "2021", "2020", "2019"..., 99 FOR DON'T KNOW, 88 FOR REFUSED, AND -96 FOR N/A]]

F5. [REPEAT FOR EACH ITEM MENTIONED IN F2] On a 1 to 5 scale, with 1 meaning "not important", to 5, meaning the item was "very important" to your decisions, how important were each of the following to your decision to install [INSERT ITEM MENTIONED IN F2] without an incentive from Focus on Energy? [INTERVIEWER NOTE: This is in reference to the equipment they mentioned in F2; energy efficient equipment installed in the past 12 months.]

Statement	Not important				Very important	Don't know	Not applicable
	1	2	3	4	5	98	96
a. Information about energy savings from Focus on Energy representative							
b. Information from a contractor							
c. Information from colleagues or friends who installed energy efficient equipment and received an incentive from Focus on Energy							
d. Past participation in a Focus on Energy business incentive offering or program over a year ago							
e. Information from an energy audit conducted at your facility							

[ASK IF F5b ≠ N/A or F5e ≠ N/A]

- F6. What was the business name of the contractor with whom you worked or who performed an audit of your facility?
1. ([RECORD: _____])
 98. (Don't know / don't recall)
 99. (Refused)

- F7. Was there anything else that was important in your decision to install energy efficient equipment without an incentive from Focus on Energy? [INTERVIEWER NOTE: This is in reference to the equipment they mentioned in F2; energy efficient equipment installed in the past 12 months.]
1. ([RECORD: _____])
 98. (Don't know / don't recall)
 99. (Refused)

G. COVID-related Questions

READ INTRO: We recognize that 2020 was an atypical year for many reasons. We are interested in learning how your business was affected and how your business operations, plans and priorities may have changed as a result.

- G1. Please let me know if your business experienced any of the following challenges or changes related to the COVID-19 pandemic. Please say yes, no, or not applicable. [PROGRAM AS TABLE. RANDOMIZE ORDER, READ LIST]
1. Increased vacancy rates
 2. Supply chain disruptions
 3. Delays and other issues related to supply chain limitations
 4. Reduction in sales or revenue
 5. Additional costs due to pandemic response
 6. Greater demand for warehousing or storage

7. [Show if B2=4] Rent collection loss due to existing tenants unable to pay
8. Temporary business closures
9. Reduced hours of operation
10. [Show if B2 ≠ 4] Difficulty making rent or lease payments
11. [Show if B2 ≠ 4] Difficulty paying utility bills
12. New rules restricting access to buildings or facilities
13. Added or increased delivery services
14. Shifted some in-person interactions to online
15. Staff worked remotely
16. Employee loss, through layoffs or otherwise
17. Major shift in your business model or practice (What was the shift?) (SPECIFY:_____)
18. Planned energy efficiency projects were put on hold in 2020 (Please describe the projects:) (SPECIFY:_____)

G2. [IF G1.18 = Yes] Which of the following best describes your current plans for energy efficiency projects that were put on hold in 2020 due to COVID-19?

1. We decided not to proceed with our postponed projects
2. Our postponed projects have been completed or will be completed by the end of 2021
3. Our postponed projects will be completed in 2022 or 2023
4. Our postponed project will be completed in 2024 or beyond.
5. I'm not sure if or when our postponed projects will be completed
98. (Don't know)

G3. [IF ANY ITEM IN G1= Yes] In what ways did your business adjust to challenges associated with COVID-19? Did you . . . [RANDOMIZE ORDER OF ITEMS 1-7, READ LIST AND CHECK ALL THAT APPLY]

1. Reduce building occupancy
2. Reduce production or operations
3. Reduce staffing or reduced employee shifts or schedules
4. Make property improvements or upgrades
5. Make health and safety improvements
6. Increase online orders, shipping and/or delivery
7. Outsource help for different or expanded services
8. Did you make any other adjustments that I have not already described (If so, please describe:_____)
9. Did not need to make adjustments

G4. [IF ANY ITEM IN G1= Yes] You indicated that your business operations were affected by the COVID-19 pandemic. Which of the following statements best describes the current state of your business operations? [READ 1-3, CHECK ONE]

1. We have resumed all our normal pre-COVID operations
2. We plan to resume all our normal pre-COVID operations eventually, but are not there yet
3. Some operational changes from our response to COVID will likely become permanent [If so, which ones? _____]
98. (Don't know)

- G5. In what way was your business' daily energy use affected by COVID-19 in 2020? [READ 1-3]
1. Increased daily energy use
 2. Had no impact on daily energy use
 3. Decreased daily energy use
 98. (Don't know)

- G6. [Ask If G5 = 1 or 3] Would you say your daily energy use in 2021 has [READ 1-3]
1. Returned to pre-2020 levels
 2. Stayed the same as it was in 2020
 3. Changed to a different level [Please describe how it has changed: _____]
 98. (Don't know)

[IF B2=4 (property management), ASK G7 TO G10 – OTHERWISE SKIP TO G11]

- G7. How was the rate of tenant turnover at your properties affected by COVID-19?
1. (Turnover increased more than usual)
 2. (Turnover decreased more than usual)
 3. (Turnover was not affected or was comparable to other years)
 98. (Don't know)

- G8. How did the vacancy rate at your properties in 2020 compare to previous years?
1. (Vacancy increased a lot)
 2. (Vacancy increase a little)
 3. (Vacancy did not change or was comparable to other years)
 4. (Vacancy decreased a little)
 5. (Vacancy decreased a lot)
 98. (Don't know)

[ASK IF G8 = 1 OR 2]

- G9. How has the trend in vacancy at your properties been so far in 2021? Would you say . . .
1. Vacancies continued to increase,
 2. Vacancies decreased,
 3. Or the vacancy rate has stayed the same as 2020
 98. (Don't know)

[ASK IF G8 = 1 OR 2]

- G10. Did your business use vacancies as an opportunity for completing energy efficiency upgrades or retrofits?
1. (Specify how impacted: [RECORD: _____])
 2. (No impact)
 98. (Don't know)

[ASK IF (G1.8 = YES OR G3 = 1 OR G3 = 2 OR G3 = Error! Reference source not found. OR G3 = 4) AND B2 ≠ 4]

- G11. Did your business use temporary closures as an opportunity for energy efficiency upgrades or retrofits?
1. (Yes)

- 2. (No)
- 98. (Don't know)

[ASK IF G11 = 1]

- G12. What property improvements, additions, upgrades or retrofits did your business make?
 - 1. ([RECORD: _____])
 - 98. (Don't know / don't recall)
 - 99. (Refused)

H. Indoor Agriculture Questions [ask section only if B2 = 6]

[ASK IF B3 = 2]

- H1. What crops or produce do you grow indoors? [SELECT ALL THAT APPLY]
 - 1. [RECORD RESPONSE]
 - 99. (Refused)

[ASK IF B3 = 2]

- H2. Are you planning to expand your indoor growing facilities in the next few years? [READ LIST, SELECT ALL THAT APPLY]
 - 1. (Yes, describe expansion plans:) [RECORD RESPONSE]
 - 2. (No)
 - 98. (Don't know)

[ASK IF B3 ≠ 2]

- H3. How likely is your business to start growing indoor crops or produce in the next few years? Would you say . . . [READ FIRST 4 RATINGS, RECORD "DON'T KNOW" IF VOLUNTEERED]
 - 1. Very likely,
 - 2. Somewhat likely,
 - 3. Not too likely, or
 - 4. Not at all likely?
 - 98. (Don't know)

[ASK IF H3 = 1 OR 2]

- H4. What crops or produce are you considering growing indoors?
 - 1. [RECORD RESPONSE]

[ASK IF H3 = 1, 2, 3 OR 98]

- H5. Would your business need to upgrade equipment or expand facilities in order to grow indoor crops, or are you ready to grow indoor crops now? [READ LIST, SELECT ONE]
 - 1. (Ready to grow indoor crops now)
 - 2. (Need upgrades or expansion)
 - 98. (Don't know)

[ASK IF H5 = 2]

- H6. Which types of facility additions or upgrades are you considering? Are you considering . . . [READ LIST, SELECT ALL THAT APPLY]

1. Installing greenhouses
2. Converting a warehouse or similar space for indoor growing
3. Vertical farming
4. Something else, please describe: [RECORD RESPONSE]
98. (Don't know)

I. Interest in New Technologies

11. Does your business use automated or smart devices to control space heating and cooling and/or lighting in your facilities? [Check all that apply]
1. (Yes, for lighting)
 2. (Yes, for heating/cooling)
 3. (No, we do not control lighting or heating/cooling with automated or smart devices) [EXCLUSIVE RESPONSE]
 98. (Don't know) [EXCLUSIVE RESPONSE]

[ASK IF I1 = 2]

12. What equipment do you use to control space heating and cooling in your facilities? [Check all that apply]
1. (Smart, Wifi or programmable thermostats)
 2. (Energy Management System)
 3. (Something else:) [SPECIFY]
 98. (Don't know) [EXCLUSIVE RESPONSE]

13. How interested would you be in a program that provides a bill credit in return for adjusting your thermostat or using less energy at certain times during the day?
1. Very interested
 2. Somewhat interested
 3. Not too interested
 4. Not at all interested
 98. (Don't know)
 99. (Refused)

14. More broadly speaking, how receptive is your business to allowing software controls to make data-informed decisions regarding your commercial energy equipment such as HVAC system, lighting, and/or process equipment?
1. Very receptive
 2. Somewhat receptive
 3. Not too receptive
 4. Not at all receptive
 98. (Don't know)
 99. (Refused)

[ASK IF I4 = 3 or 4]

15. Why do you say that?
1. [SPECIFY]
 98. (Don't know)

99. (Refused)

J. Firmographics

We are almost finished. Now I have a few questions about your company that will help us with our analysis. Your responses will be kept confidential.

[ASK J1 TO J5 IF B2 ≠ 4]

- J1. Is [ADDRESS] your company's only location, or do you have multiple locations in Wisconsin?
 1. (Only location)
 2. (Multiple locations)
 98. (Don't know)
 99. (Refused)
- J2. What is the approximate square footage of heated and cooled space in your facility at [ADDRESS]?
 [NUMERIC OPEN END UP TO 1,000,000]
 1. [SPECIFY]
 98. (Don't know)
 99. (Refused)
- J3. What are the hours and days of operation in your facility at [ADDRESS]? [SPECIFY HOURS PER DAY AND DAYS PER WEEK]
 1. [SPECIFY]
 98. (Don't know)
 99. (Refused)
- J4. Is your facility heated primarily with electricity or gas? [REPEAT [ADDRESS] IF NEEDED]
 1. (Electricity)
 2. (Gas or propane)
 3. (Electricity and Gas/Propane Equally)
 98. (Don't know)
 99. (Refused)
- J5. Does your organization own or lease this facility? [REPEAT [ADDRESS] IF NEEDED]
 1. (Own)
 2. (Lease)
 98. (Don't know)
 99. (Refused)

[ASK J6 TO J9 IF B2 =4]

- J6. Does your company manage one property or multiple properties in Wisconsin?
 1. (One property)
 2. (Multiple properties)
 98. (Don't know)

- 99. (Refused)
- J7. Are your properties heated primarily with electricity or gas?
 - 1. (Electricity)
 - 2. (Gas or propane)
 - 3. (Electricity and Gas/Propane Equally)
 - 98. (Don't know)
 - 99. (Refused)
- J8. Does your company own or lease the buildings that you manage?
 - 1. (Own)
 - 2. (Lease)
 - 3. (Both / own some and lease some)
 - 98. (Don't know)
 - 99. (Refused)
- J9. What is the approximate total square footage of heated and cooled space in facilities you manage?
 - [NUMERIC OPEN END UP TO 1,000,000]
 - 1. [SPECIFY]
 - 98. (Don't know)
 - 99. (Refused)

K. Closing

Those are all the questions we have today. Thank you for your time and opinions. Have a great day!